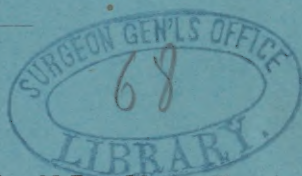


Stockton-Hough (John)

AN INQUIRY
CONCERNING THE
RELATIVE INFLUENCE
OF THE
SEX OF THE FETUS IN UTERO
ON THE MENTAL, PHYSICAL, PHYSIOLOGICAL,
PATHOLOGICAL, AND DEVELOPMENTAL
CONDITION OF
THE MOTHER
DURING GESTATION, LACTATION, AND SUBSEQUENTLY.

BY
JOHN STOCKTON-HOUGH, A.M., M.D., Mag. Chem.



*Reprinted from the AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF
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For convenience of classification we shall treat the subject of our essay under the following different propositions, taking each in chronological order from conception to weaning.

Influence of child without regard to sex.

Relative influence of each sex.

1. On producing extrauterine gestation.
2. On the time of quickening.
3. On the temperature of the mother.
4. On the pulse of the mother.
5. On the composition of the blood of the mother.
6. On the digestive system.
7. On the composition and quantity of the urine.
8. On producing edema of the vulva and limbs.
9. On inoculating the mother with the constitutional peculiarities and maladies of the father.
10. On the duration of gestation.
11. On the position and presentation of the fetus.

12. On the duration and production of difficult labor.
13. On determining the site, weight and conformation of the placenta.
14. On the quantity, quality, and duration of the lochia.
15. On the quantity, quality, and duration of the lacteal secretion.
16. On arresting the growth, development, and nutrition of the mother.
17. On the determining the sex and weight of the next succeeding fetus.
18. On the length of the inter-gestation period.
19. On the mental condition of the mother.
20. Influence of co-twins of different sexes on each other.

A pardonable curiosity has been manifested in all ages concerning sexual differentiation in the human species, particularly with regard to the causes which determine the production of the sexes, and the influences reflected by the peculiarity of each sexual organization on the mother during the time she carries the fetus in utero, and subsequently on the product of such conception itself, thereafter throughout life.

Among the ancients, medical men, philosophers, divines, and astrologers, such as Aristotle, Hippocrates, St. Thomas Aquinas, Lactantius, Pliny, occupied themselves much with these questions, as have innumerable others down to the present day.

Innumerable then are the authors and their opinions on the influence of the fetus in utero on the mother, and many of these have occupied themselves with a differentiation of these influences by sexes.

To arrive at a clear understanding of these influences, it will be necessary to review the influences in general of the fetus in utero on the mother without regard to sex, and in the second place, to study the influence of the predetermined developmental powers peculiar to each sex conferred on the fetus at the time of conception, and thirdly, to return to our theme to study and compare the different influences of children of each sex on the mother during gestation and lactation.

By a careful study and analysis of these effects of a difference of sex, we hope to discover the causes producing them, and thus add to our knowledge of those influences which are instrumental in determining the sex of the child.

Concerning the effect of the sex of the fetus on the "color" of the mother, Sebizi¹ (p. 495) very properly remarks that these aphoristic propositions are for the most part true, but for obvious reasons they are to be taken *cum grano salis*, as all women who bear males are not necessarily in good health at the time, and consequently may not have a good color, but given two women in good health, the one who carries a boy will usually have a better color, better appetite, be lighter in her movements, and experience less malaise in general, than one who carries a female. Hippocrates, Galen, Aristotle, and Avicenna are all of the same opinion.

The following are the signs of a male conception as given by Avicenna, *L. 3, Can. Sen. 21 tract. 1. C. 13*: Her color is better, her action is more agile, that is, more prompt and expeditious in her movements, the burden or weight of the uterus is less sensibly felt, her appetite is better; she is lighter in going about; should the gravid uterus incline to the right side, as usual with males, the right breast will be more enlarged, contain more milk than the left, the milk will be thicker, less aqueous, the nipples will be redder, the right pulse will be fuller and stronger. In rising to walk she will move the right foot first, her right arm will be strengthened, the right eye will be brighter and move more quickly. The contrary signs prevail with a female conception.

Dr. Carlile,² of Palmyra, Ill., claims to have discovered that in pregnancies with male children the areola of the nipple is "very dark in color," while with females it is "not very dark in color." He says that he "found almost invariably that when the sex is male the color of the areola was much darker than when the sex was female." In this manner nineteen out of twenty males were determined (predicted), and eleven out of eighteen females.

I have not met with any opinions concerning the rust-colored spots on the skin of pregnant women, whether they prevail more with male conceptions than with female.

According to Aetius, *L. ferm. 4, c. 9*, if a woman conceives with a boy, the right nipple is larger, the veins and arteries on

¹ Melchior Sebizii, *Excitationes medicæ. De discrimine corporis virilis et muliebris. Item de notes Virginitatis*, 4to, Argent., 1672, pp. 94

² *Med. Record*, N. Y., May 15th, 1880, p. 554.

the right side are perceptibly tumefied, as one may see under the tongue; the pulse of the right arm is healthier, swifter, greater, and harder. The pupil of the right eye is larger and more brilliant than the left. The arteries of the right temple are more agitated and swollen than on the left side. Her spirits are gay, mature milk is generated, and the mammæ are more solid. If the woman conceives of a girl, she is sad, the mammæ are flaccid and more pendulous, the temporal artery of the left side is tumefied, and the milk arrives later. If the milk is dropped into the urine of a gravid woman it sinks and remains at the bottom if a male, but rises if a female. If a drop be allowed to fall on a mirror and it adheres together and rolls about like quicksilver, it is a male; but if it separates, it is a female.

Signs of a conception with a male. [Out of Culpeper.]

"1. The woman, when she riseth up from a chair or the like, doth sooner stay herself upon the right hand than on the left.

2. The belly lies rounder and higher than when it is a female.

3. The child is first felt to stir on the right side, because, according to Hippocrates, the male children lie on the right side of the womb.

4. The womb breeds boys easier and with less pain than girls, and [the woman] carries her burden not so heavily, but is more nimble in moving.

5. The right breast is more plump and harder than the left, and the right nipple redder.

6. The color of the woman is more clear and not so swarthy as when she conceives a girl.

The contrary to these are signs of conception of a female; it were but loss of time and blotting of paper to quote them.

These are some of the vulgar rules, and the best of them. I never knew these fail:

1. If the circle under the woman's eye, which is of a wan-blue color, be more apparent under the right eye, and the veins most apparent in her right eye, and that most discolored, she is with child of a boy; if the said marks be most apparent in the left eye, judge her to be with child of a girl.

2. Let her milk a drop of her milk into a basin of fair water,

if it sinks to the bottom as it drops in, round in a drop, it is a girl she goes withal; for if it be a boy, it will spread and swim at the top. This I never knew to fail, though it be contrary to all authors that I ever read.”¹

Dr. McDonald,² of Liverpool, claims to have predicted unerringly the sex of the fetus during the last month of gestation in every case (eight multiparæ and one primipara) by the external form of the abdomen. He alleges that “if the form of the abdomen be conoid and projecting (child carried in front), the child is male; if the form be more flattened and rounded (child carried round about), the child is female.”

Dr. McD. suggests that strips of lead be used to determine the shape or projection of the abdomen in the median line, and transversely. The doctor has reason to believe the method applicable to breech presentations, and to a period of at least two months before delivery. As yet, “he has not constructed an hypothesis to explain the facts.” Oslander, as will be seen further on, has much the same views, claiming that the abdomen becomes more depressed with advancing pregnancy when boys are carried.

From Wagner³ we gather the following:

Occasionally it is well to note the diversity, according to the sex of the fetus, of the changes in the female body during pregnancy. Indeed, most of the phenomena derived therefrom in all ages are extremely fallacious and uncertain, and therefore judgment of the sex of the fetus during pregnancy can only be made cautiously, if indeed at all [*literally, and almost not at all*]. Hence, far back in the earliest times men endeavored to foretell the sex of the fetus, and as generally happens, sought to support their diagnostic signs with false hypotheses. At all events, it is plain to see from various proofs that there exists, according to the sex of the fetus, some diversity in the general mutations of the female body. For in the first place, experience teaches it is necessary that the constitution of the

¹ Nicholas Culpeper: A Directory for Midwives, etc. 12mo. London, 1671, pp. 102-3.

² The Antegenetic Discovery of Fetal Sex. London Lancet, February 3d, 1883, p. 222.

³ Wagner (Gulielmi): Commentatio de Fœminarum in Graviditate Mutationibus. 4to. Brunswige, 1816, pp. 150-155. (Secundum Fetus Sexuum.)

maternal body (which is) to procreate males be other than that (whose office it is) to procreate females; as this is already required in coitus—indeed, as pregnancy is naught else than the continuation and evolution of coitus itself, or rather of that state which begins with coitus, it is likewise evident that during pregnancy the constitution of the feminine body must be different according to the sex of the fetus; in fact, a certain peculiar disposition of the feminine body is required not only in coitus to determine the sex of the fetus, but also in pregnancy to evolve it. Thereupon we may, from the diverse nature of boys and girls, divine this; when the difference between them (quorum) has been evolved in the maternal body, and a peculiar (certa quadam) conjunction, this too dependent on sex, intervened with the maternal body, it may be considered probable that (all this) has entered into the disposition of the infant in a certain ratio; although (licet) the evidences of this are not always certain. This is especially illustrated in our times in the disquisitions of the celebrated Osiander,¹ who certainly affirms that those women who bear females in their womb universally enjoy better health than those who bear males. For the illustrious man asserts that in the latter there is frequently to be observed a fancy for certain dishes and again an immoderate appetite for other ones. That they are oftener taken with vertigo and fainting; that they are more inclined to somnolence, suffer oftener from inflammation of the breasts, heart-aches, colic, bad stomach (alvi obstructione), flatulency, and the swelling of the stomach which arises therefrom, but that the abdomen becomes more depressed with advancing pregnancy. But in those bearing females in their womb he more frequently noticed nausea and vomiting, and in the interval he saw that their infirmities were extremely prolonged (admodum dies ægrotantes). In addition, Astruc and Wigand² assert only in those pregnant of males that often a darkish tract may be seen on the abdomen, but not on those with females. Which nature of the female body appears to me upon great consideration to be more en rapport with the maternal one, and not to affect great changes therein; whilst

¹ Denkwürdige Reden für die Heilkunde und Geburtshülfe, Bde. 2.

² Beiträge zur theoretischen und praktisch. Geburtsh.

on the other hand the male fetus, more foreign to the nature of the mother, may affect it more deeply (*gravius*).

In addition to this, when we consider that it is probable that a larger proportion of females are conceived during the first half of the inter-menstrual period, and a larger proportion of boys during the last half of this period, we admit that different physical or physiological conditions are necessary to beget one or the other sex, and these conditions probably continue during gestation.

It has been observed among various peoples that a prepotent force is necessary on the part of the father to beget males, and on the part of the mother to beget females. Hence it is very clearly to be seen that in each coitus one or the other sex is determined at the time of the act. For whatever conditions preside at the time of conception continue to manifest their influence throughout the period of gestation, and the sex of the fetus in its turn determines the diversity of the peculiarities in the constitution of the mother. From the manifestations of these peculiarities we may read or foretell the sex of the fetus in utero.

Much has been said by the ancients, and gainsaid by the moderns, about the superiority, higher temperatures, and male-producing qualities of the organs of the right side of the body, and now we have to record the fact that in a certain case the milk of the right breast contained much more solid matter, from one and one-half to nine times as much as that of the left, and so great was this difference in quality that the children of each pregnancy refused to nurse the left breast.¹

The ancients also contended that the right ovary and the right testicle elaborated the elements which were destined to produce male conceptions, and the production of females was equally ascribed to the left.

Whether there is any difference in the size and weight of the ovaries of the right and left side I do not know, but we think it probable that the right ovary is larger and heavier than the left, because we know that the left testicle is larger and more pendulous than the right. And this, added to the following concerning the Fallopian tubes, tend to strengthen this view :

¹ London Lancet. April. 1871. p. 215, Amer. edit.

"Up to the seventh month of fetal life both tubes are of equal length; from that time, however, the growth of the left is a little less than that of the right. The average result of ten examinations of girls who died before puberty was as follows: The right tube measured 5.98 cm. in length, the left 5.7. The average of nine examinations of virgin women who died between the ages of 16 and 81, was 9.5 cm. for the right, and 8.5 cm. for the left tube. After the menopause the oviducts may grow from 2.5 to 4.5 cm.

During the active period of the sexual organs, the difference in length between the two tubes is less marked; the average of twenty-two examinations in married women under 45 years of age gave for the right 11 cm. and for the left 10.9 cm. After the menopause, however, the difference is striking, being in twelve women examined between 46 and 80 years 9.75 cm. for the right and 9.1 for the left."¹

Dr. Blackwood,² of Philadelphia, has recorded a most interesting case of alternate menstruation from the right and left sides. This woman, aged twenty-two years, was found to have a hymen with two orifices, a double vagina, with a cervix uteri opening into each, and the uterus was completely divided by a longitudinal septum. At the time of menstruation there was congestion of one side of the uterus only, viz., that from which the flow occurred. And menstruation occurred alternately right and left, with one exception, during the thirteen menstrual periods she was under examination.

A patient writes that "every other month menstruation continues two days, and on the alternate months its duration is from four to five days. The two-day periods are painless and natural, but the alternate periods are always attended with pain and a sense of weight or bearing-down for about twenty-four hours at the commencement."

The author³ from whom I quote the above says, "I am unable to suggest any theory which will explain these facts except that of alternate menstruation." Continuing, he says, "I have, however (having had my mind for years directed to this point), found several cases in which the patients had long been con-

¹ AM. JOURN. OBSTET., New York.

² Medical Times, Oct. 25th, 1879.

³ Trall's Sexual Physiology, 12mo, N. Y., p. 184-5.

scious of pain and distress only in the region of one ovary at the menstrual period, and in nearly all of these cases the patient (on calling her attention to the subject) could very clearly recollect that there had long been a difference in the menstruation, that of each alternate month being more prolonged, more painful, or more hemorrhagic, or different in all of these respects."

We have stated that the intention and tendency in a state of nature is to produce the sexes alternately, male and female, and we here see that it is probably the same intention to mature a Graafian follicle alternately, one month in the right ovary and the next month in the left, and these differentiations in the position (side) being different in incipient force and intention, cause a reflex action on the woman different in intensity, exhibiting itself in a different degree of malaise, lassitude, irritability, congestion of uterus, quantity, quality, and duration of menstrual and lochial discharge.

We have always argued that the begetting of *females* on the *part of males* was a higher or more difficult rôle than the begetting of males, or in other words, each sex calls into action a higher genetic force or function to beget the opposite sex than it does to beget its own. We know that the left testicle descends first into the scrotum, is larger, heavier, and more pendulous than the right, from which we infer that there may be some truth in the saying that the right testicle generates males and the left females. Those who have opposed these opinions by what they consider as unanswerable facts, rely upon the fact that men having lost one testicle and women having lost one ovary beget indifferently male and female offspring.

This argument is based upon a wrong interpretation of this theory, implying that the ovary or testicle of one side is *predestined* to beget *one sex* and that sex only. Whatever may have been the intention of the advocates of this theory, we do not believe that there is such a thing as *predestination of sex*, but that one or the other sex is produced, determined at the moment of conception only, by the relative maturity, relative vigor, or relative quantity or force of the elements of reproduction derived from each parent uniting to form the product of conception.

If it be admitted, therefore, that the right side is stronger,

more highly developed, warmer, etc., than the left, it is probable that the ovum developed in the right ovary may be superior in these respects to that of the left, and should the requisite quantity and quality of sperm arrive at the proper time, it will probably determine a male conception. Should one ovary or testicle be extirpated or become inactive by disease, the remaining one will perform the functions of both and evolve an egg or a spermatozoid capable of producing a male or female, according to the condition of the male and female during the elaboration of these elements, and this single ovary may tend to produce alternately ovules, or spermatozoids, at one time suited to produce a male, and at another time more apt to produce a female.

I do not wish to be understood to contend that males are produced only from the ovary of one side and females only from the ovary of the opposite side, but that, in healthy females living in a state of nature, there is an *intention* in the laws of nature to produce ovules in one ovary at a time and the next succeeding ovulation in the ovary of the opposite side, alternately right and left, and that the ovary of one side (probably the right) usually produces ovules better suited or in a condition more likely, when fecundated, to result in a male conception; and that the opposite side produces alternately ovules more likely, when fecundated, to produce females, though this rule is not invariable, and ovulation may take place from the same side twice in succession, producing the same or a different sex each time, probably a different sex each time, because the influence of the sex of the previous child on the mother always has a *tendency* to cause a change of sex in the gestation immediately succeeding, particularly where the woman nurses the child the usual period, and conceives within one year from the birth of the last child, or before the effect of the sex of the previous child on the condition of the mother has entirely disappeared.

1. *Influence of the Sex of the Fetus in Producing Extrauterine Gestation.*

Almost nothing is definitely known of the causes or conditions which favor extrauterine gestation, though some cases have been ascribed to fear or strong emotion at the time of coitus or conception.

It is a fact frequently observed that such women have shown previously a remarkable inaptitude to conception during periods varying from five to eighteen years in the cases recorded. In these cases we should suspect atony or abnormal adhesions from disease of the canal or extremity of the Fallopian tubes and adjacent organs.

Some years since, Dr. John S. Parry,¹ then preparing his book on extrauterine gestation, at my suggestion (having called his attention to the views of Dr. Hubbard²), sought out and recorded the sex in as many cases of extrauterine gestation as were within his reach, with the following result, *viz.* : 41 or 55.4 per cent males, and 33 or 44.6 per cent females. Dr. Hubbard contended that, from the position he took in regard to the determination of the sex of the child, females being produced at the commencement of menstruation, and males after menstruation ceased, that the fimbriated extremity of the Fallopian tube was more likely to fail to erect itself and seize the ovary at the point of the rupture of the Graafian follicle at the end or after menstruation had ceased, than during the earlier days of this process, the time by him ascribed to the conception of females, hence more male conceptions would fall into the abdominal cavity than female.

This view is not strengthened by the few cases Dr. Parry has been able to bring together. Dr. von Mausfelde³ contends that the child in cases of extrauterine gestation is usually of the female sex, an opinion deduced from his theory, and based on the few cases he could have seen.

Here again the importance of stating the sex of the fetus is of the greatest moment. As it is, it is wanting in so many cases that we have too few data to come to any valuable conclusion.

2. Influence of Sex of Fetus on Time of Quickening.

Avicenna taught "concerning the first motion of the infant: If to the time wherein the fetus received its formation, you shall only add twice that space of time, that is the time of the motion

¹ John S. Parry: *Extra-Uterine Gestation*. 8vo, Philadelphia, 1876, p. 82.

² Silas Hubbard, *Buffalo Medical Journal*, 1851, vol. vii., p. 251.

³ Sex Production. *Proceed. Nebraska State Med. Soc.*, 1890.

of the fetus. Wherefore Hippocrates has said before, if the male be formed in thirty days, that is in one month, it will in like manner be moved in sixty days, after the thirtieth, that is the ninetieth, to wit, in the third month.

"In like manner, whereas he hath said that a female is formed in forty days, if more than double be added to these, that is, eighty-four more, then the female begins to move itself, to wit, in the fourth month and six days.¹

"But the female obtains its primary formation in two and forty days at farthest, but the male in thirty, which is the longest time. . . . Truly for the most part those women that bring forth females are purged two and forty days after the birth, which purgation, as it is very long, so it is complete, . . .

"But such as bear males have their purgation thirty days, which are the longest of that sort, and in fullness and perfection (p. 17).

"Women have their purgations after child-birth for this reason, because before the two and fortieth day, if it be a girl, and the thirtieth if it be a boy, there is but a small quantity of blood contributed for the increase of the fetus; but afterward it flows in, more abundantly, until the infant comes into the world. Wherefore it is necessary that the purgation at the birth should flow and be brought forth, in proportion to the number of days.

"Now I shall speak something, to demonstrate that the limbs of the child are distinguished and discerned, the female in two and forty days at most, and the male in thirty. Of which thing the purgation which happens after the birth, for two and forty days of a female and if a male thirty, which is indeed the longest space, is a confirmation. . . . And because the female increaseth and is formed more slowly, it is manifest that the seed thereof is weaker and moister than that of the male, and for that reason must be longer in forming than the male, and that the purgation must continue longer after the birth of the female than the male.²

"Tearmes flow after the fourteenth day, and the childe is felt to stirre and move after the fifth day. To be short, all things

¹ Gorraeus, *Annotat. upon Hipp. Concerning the Seed*, p. 98.

² Hippocrates, *Two Books Concerning the Seed*, etc.

are more quick, lusty, and strong in the male than in the female, *Reusn.*

“And to be short, because the seed of the male is hotter and livlier than of the female, therefore all things in the male are sooner performed, as the male receiveth all the lineaments of his body, and perfect shape of a man in his mother’s wombe in thirty days: the female in forty. The male beginneth to stirre in the wombe in three months: the female in foure. The male is borne and cometh forth of the wombe in nine months, the female in ten. And the mother herselfe after the birth of a male, hath forty daies assigned for her purification; but after the birth of a female, four-score daies, *Leviticus*, 12; 4, 5. And that men are hotter in constitution than women, may easily appeare in that they have fewer excrements, larger veines, blacker colour, greater and lustier members, greater voice, more audacity and courage than women, *Bertinas.*”¹

Concerning the movement of the child in the womb, Hippocrates says that it “happens to the male in three months, but to the female in four months.

“But the male is stirred first because it far excels the female in strength; and is likewise formed soonest, because the seed that composeth it is stronger and thicker.”

Elsewhere we have shown from the record of forty cases observed by Ravn, that the average number of days from conception to quickening was 134 with boys, and 149 with girls.

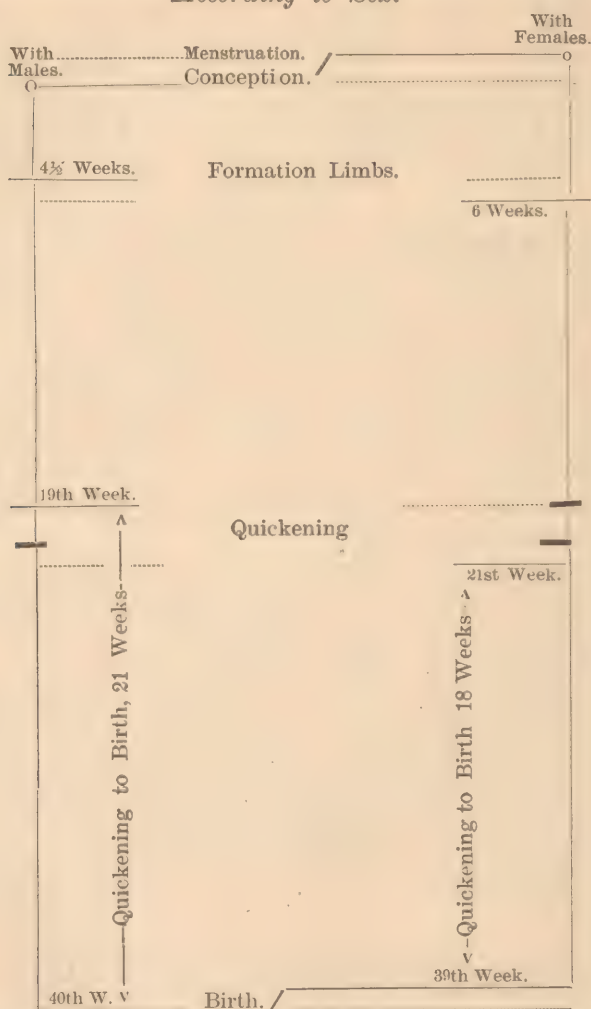
Unfortunately we have not been able to gain access to a copy of Claude Bailly,² wherein he gives his reasons for believing that the male is formed more quickly than the female.

The following table will exhibit more clearly these differences.

¹Fletcher, I. The Differences, Causes, and Judgments of Urine: according to the best writers thereof, both old and new. 8vo, pp. 124. Lond., 1641.

²Ergo mas celerius foemina tardius conformatur. In folio, Paris, 1569.

Table Illustrating the Periods of Development of the Fetus According to Sex.



The function of nutrition, says Moreau,¹ commences immediately after the conception, and according to Hippocrates,² it is less active if the embryo is male, than if it is female. He adds, "If the opinion of Hippocrates was confirmed, the male

¹ Hist. Nat. de la Femme. Vol. i., p. 177.

² De Natura Pueri. Lect. x.

embryo would be formed thirty days after the conception, and the female forty days after the same epoch."

Moreau very properly observes, that "after the birth at least, this alleged slowness of development in the female will be changed, since the nutrition and growth go on with much more rapidity among women than among men. Their interior organs, their external form, their faculties, all develop in a very rapid manner, and the body of the woman is as well formed at twenty as that of the man is at thirty."

We contend that this change in the relative rapidity of development begins at the time of quickening, and that the female fetus consumes a fortnight less time in developing from the moment of quickening to the time of birth than does the male, as may be more clearly seen in another part of this paper.

3. Influence of Sex of Fetus on Temperature of Mother.

"Dr. Granville¹ has asserted that the temperature of the uterus sometimes rises as high as 120° F., the elevation seeming to bear some ratio to the amount of action in the organ." Dr. Dunglison had some observations made with a view of determining these questions, and Dr. Barnes, to whom was intrusted this duty, found that in three cases where the labia were respectively 100°, 100°, 102°, the uterus was 100°, 102°, 106°, during parturition. Fricke and Gierse² could not find any constant elevation of temperature in the vagina of pregnant females, yet they found a maximum excess of .54°, hence the following verses:

"For then, if she conceives the genial fruit,
The soil has strength to feed the spreading root.
Her vital heat increases, and her blood
Then swells within her womb, a rosie flood
From whence the future birth imbibes its food.

—Quillet, *Callipædia*, B. 1, p. 23. Edit. 1872.

Close observation would probably show an appreciable elevation in the temperature of the uterus during gestation, as compared with the non-pregnant state, and there would probably be a greater elevation when carrying a male fetus than when carrying a female, particularly before quickening, though this eleva-

¹Philos. Trans., 1825, p. 262; and Sir E. Home, *Compar. Anat.*, v. v. 201. London, 1828.

²Henle: *Handb. d. Ration. Pathol.*, 1846.

tion might be reduced in favor of the female, during the period subsequent to quickening, owing to the more rapid development of the latter.

Temperature of fetus a few tenths of a degree (Centigr.) higher than that of the mother.

4. *Influence of the Sex of the Fetus on the Pulse of the Mother.*

M. De la Brousse,¹ in a letter to M. Desbrest, says: "I maintain that the pulse of the radial, temporal, and other arteries (of the two sides of the body) is always equal in perfect health, and that in disease it is always stronger on the side affected or suffering." This observation, he says, is confirmed by the researches of MM. de Borden and Fouquet. Continuing, he says the contrary happens in pregnancy. There is often feebleness in the pulse on the side to which the infant inclines the more, and it is without doubt occasioned by the compression it causes on the arteries of the lower belly, which makes itself felt on the radial of the same side.

Hippocrates, in the forty-eighth aphorism, assumes that "foetus qui mares sunt dextrâ, foeminæ sinistrâ majis sunt." De la Brousse says, "I will endeavor to affirm this passage and add to the means of proving it."

He declares that in thirty observations made with the object of predicting the sex before the labor, made for the most part from the sixth to the ninth month, he always announced the sex correctly, except in three cases, from simply feeling the pulse of the pregnant woman. In the cases in which he failed, the women were more or less sickly.

He declares that the body is divided into two lateral halves, of which the right side is the stronger. Among pregnant women, on the side to which the child inclines the pulse is more feeble, by reason of the weight which compresses and hinders the circulation, and in consequence the physician who finds

¹ Sur la connoissance du poulx dans les grossesses, qui peut servir à distinguer les mâles et les femelles, avant l'accouchement.

Journal de Med., Chirurg. Pharm., Aoust. 1771, pp. 121-129.

Lettre à M. Desbrest qui peut servir de suite aux observations précédentes sur la connoissance du poulx dans les grossesses, *ibid.*, pp. 129-133.

Observations sur les différentes sortes de poulx, *ibid.*, p. 134-141.

De la Brousse. Réponse à M. Amoureux, fils, *ibid.*, Sept., 1771, pp. 227-228.

the pulse more feeble on the left side in a pregnant woman who is otherwise in good health could boldly announce a girl, and the contrary when the pulse on the right side will be more feeble.

Amoureux,¹ fils, in his letter to M. De la Brousse concerning the doctrine of the pulse, says that in China² they feel the pulse with four fingers in three different places, that is to say, at the wrist, at the junction of the wrist, and at the cubitus.

The pulse of the wrist of the right hand indicates that which regards the heart and the small intestines; the pulse of the juncture of the same side indicates that which regards the liver and gall; the pulse of the extremity of cubitus of the same side indicates that which regards the left kidney and the bladder. The pulse of the wrist of the right hand announces the affections of the lungs and the large intestines. The pulse of the juncture on the right hand regards the orifice of the stomach and the ventricles of the heart, and the extremity of the cubitus the disease of the kidney of the same side.

The Chinese "secret of the pulse" maintains that "in a man the pulse at the wrist should always be more strong than that of the cubitus. . . . On the contrary, the pulse of the woman at the cubitus ought always to be more strong than that of the wrist." P. 409.

"If a woman generally has the pulse at the extremity of the cubitus small, weak, and sharp, the abdomen is generally cold, and subject to various shiverings, though she be ever so young, and she may be certain she will never have a son, but if she is advanced in years she will have neither son nor daughter." P. 418.

The ancient book gives the plain rule. When the pulse is superficial or deep, as it ought to be in the three places of each arm, and the finger being pressed upon it, the beats continue to be felt, the woman is with child.

¹ Journal de Méd., Chirurg., Pharm., etc., 12mo, Paris, Sept., 1771, pp. 217-227.

Seconde lettre à M. De la Brousse, sur la découverte du pouls de grossesse qui fait distinguer les mâles et les femelles avant l'accouchement, *ibid.*, Juillet, 1772, pp. 62-76.

² Du Halde: Description de l'Empire de la Chine, etc., 4 vols., folio, Paris, 1735. (Fin du 3me vol., traduct. du Livre chinois sur le pouls par le père Harvieu, missionnaire. English transl., 2 vols., folio, London, 1791; another edition in 8vo, London, 1736.)

In the first months of pregnancy the pulse of the wrist is often small, and that of the cubitus quick; if, in pressing it with the finger, it seems to disperse, she is three months gone; but if it does not disperse, but keeps its usual consistence, she is in her sixth month.

When the termes cease after conception, if the pulse be long, tremulous, 'tis a false conception. In the seventh or eighth month of pregnancy, if the pulse be full, hard, and strong, 'tis a good sign; if deep and slender, the woman will have a hard labor, and die in child-bed.—Du Halde, p. 195, vii., ed. 1791.

Continuing, he says: "I have found nothing for the womb, but here is the pulse for that which concerns pregnancy: 'When the pulse of a woman is felt at the extremity of the cubitus and it is found to be *Hoa*, slippery, it is a sure sign that she is pregnant. If it is at this place of the right hand that you feel the pulse, and find at the same time *Hong*, overflowing, she is with child of a daughter.'

If it is in the left hand that the same is found, she is with child of a son. If the pulse at the same time is found the same in both arms, the woman is pregnant with two children. He who understands this method will never be deceived."¹

5. *Influence of the Sex of the Fetus on the Composition and Quality of the Blood of the Mother.*

Bequerel and Rodier analyzed the blood of nine pregnant women, and, according to Montgomery, "they conclude that pregnancy exercises a marked influence on the composition of the blood. The density, both of the defibrinated blood and of the serum, is diminished, the water, the fibrin, and the phosphorized fat are increased, while the corpuscles and the albumen are diminished."

Andral and Gavarret analyzed the blood of thirty-four pregnant women, and found that while the fibrin was below the physiological mean of 3 during the earlier months of pregnancy, that during the last three months of pregnancy the fibrin was found above the physiological standard, from 4 to 4.8, or a mean of 4.3 in the last month.—Montgomery, p. 283.

¹ Du Halde: *Description of China and Chinese Tartary*. 4 vols., 8vo, London, 1736. Vol. iii., "The Secret of the Pulse," pp. 366-469, in three parts, p. 376.

“The blood then,” he (Andral) says, “manifests a remarkable tendency to assume the character of blood of inflammation, and without doubt we have to reflect on the relation which may exist between the kind of modification which the blood then undergoes, and the development of those special accidents, generally of an inflammatory appearance, which so often affect women recently delivered. Ought we to regard the slight excess of fibrin which in them exists in the blood as a predisposing cause of these accidents?”

On sheep and cows they made some interesting analyses several hours before and after delivery, showing that after delivery the fibrin and blood-corpuscles increased and the serum and water diminished.

We here see that pregnancy causes a change in the composition of the blood, but whether that change is greater in proportion or different in nature when a male fetus is carried from what it is when a female fetus is borne, we have no data upon which to base an opinion, as the sex of the fetus is not given.

We may infer, however, that as the proportion of the various substances entering into the composition of the blood is different in adult males from that found in adult females, and that these differences exist possibly to a greater extent in the fetus (if we may judge from the temperature, pulse-rate, etc.), so it is therefore probable the greater density or less watery condition of the blood in the male fetus determines in the circulatory system of the mother the production of more highly fibrinated blood than when a female conception is carried, and consequently exposes her to greater liability to the inflammatory maladies incident to child-birth.

The following differences were found to exist between the blood of an adult man and woman by Foedisch :

	MAN.	WOMAN.
Iron.....	9	8
Fibrin.....	28	25
Cruor.....	140	129
Albumin.....	91	96
Water.....	732	742
	1000	1000

From an examination of this table we see that the proportion of solids in the blood is greater in man, and the proportion of

fluids greater in woman. Now, whether this difference in the composition of the blood exists to as marked a degree in the fetus, we have no facts to appeal to, but arguing from analogy, we should be inclined to think it quite as great, if not greater, as the difference in the pulse-rate and temperature of the body we know are greater between the male and female than between the sexes in adults.

In the adult we have 58.5 per cent of water, and of fixed substances 41.5 per cent.

According to Bischoff, one finds in the composition of the new-born child 64.4 per cent of water and 25.6 per cent of fixed matters.

Fehling gives from his experiments 74.4 per cent of water in the composition of the new-born.

I have taken the trouble to calculate from a table given by Pinard¹ the relative proportion of water in the male as compared with the female fetus in the fifth, sixth, and seventh month of intrauterine life, with the following result, viz.: Seven boys were composed of 86.22 per cent of water, and six girls gave the proportion of 86.96 per cent of water to 13.04 per cent of solid matters.

We have, therefore, no positive evidence that the blood of the pregnant woman is different in character when carrying a male from that usual in carrying a female; yet we are persuaded that there probably is a difference, however trifling, as we have seen that female conceptions are attended with constipation, indicating an absorption of fluids into the circulation. If the blood contains a larger proportion of water in the case of female conceptions, this might in some measure explain the longer duration of the lochial discharge in such cases.

6. *Influence of Sex of Fetus in Producing Disturbance of Digestive Organs of Mother.*

Aristotle says that purgations happen to many after they have conceived for a certain time, namely thirty days, especially if a female be conceived, forty if a male.

Godart,² after quoting Cardau, *liv.* 12, *De Subtilitate*

¹ Article on Fetus. Dict. Encyclop. des Sci. Med., 8vo, Paris, 1878, p. 479.

² Godart: *Marque Singulière de la Grossesse du sexe.* Jour. Med., Chir., Phar. etc., 12mo, Paris, 1759, pp. 529-532.

and Albertus Magnus, *De Secretis Mulier*, Chap. VIII., says, it would be desirable to know why a certain class of symptoms accompany a masculine pregnancy, and certain others a feminine, and cites the case of a woman who in her first pregnancy was very constipated for a few days, and gave birth to a girl. The same thing happened again in her second pregnancy, and again a girl was born. During a third, fourth, and fifth pregnancy her bowels were moved regularly, even twice a day, and in each of these pregnancies she gave birth to a boy. The sixth pregnancy, finding herself constipated as in the two pregnancies first mentioned, she predicted that she would give birth to a girl, and was not disappointed.

Dr. Mattei¹ records the case of a woman forty-three years of age, in good health and rather stout, who was already the mother of four children, who, in speaking of her pregnancies, said that when she carried a boy she vomited very much, while with girls she did not vomit at all. Dr. M. explains this difference by saying that the presence of boys produces in the uterus more activity than the presence of girls. Possibly the slightly greater volume of the male fetus might aid in explaining this phenomenon.

The constipation in the case cited by M. Godart might be explained by the fact of there being a larger proportion of fluids in the female fetus than in the male. As the fetus draws its supply wholly from the mother, the female fetus must consume a larger proportion of fluids than the male, and this, coupled with the estimated greater rapidity of formation of the female between quickening and birth (probably amounting to a fortnight), we can readily understand why the nourishment and development of the female fetus should be perceptibly more exhaustive physically than the male. Hence we may infer that women are much more frequently constipated carrying girls than in carrying boys, and this would account for the other concomitant symptoms attributed from all time to a gestation with a girl, viz., heaviness of spirits, drowsiness, bad color, indigestion, etc., all symptoms of constipation.

7. Influence of the Sex of the Fetus on the Urine of the Mother.

It is now universally conceded that the condition of pregnancy

¹ Clinique Obstetricale, Gazette Obstet., 5 Mai, 1874, p. 104.

has a marked influence on the character, composition, and quantity of the urine.

In 1831 Nauche announced the discovery of the keyesteinic pellicle, in the *Lancette Française*.

Eguisier¹ in 1839 considered this pellicle an invariable attendant on pregnancy, others think it of some value as a corroborative indication, while some consider it of no value at all.

A woman is reported to have had diabetes in three successive pregnancies and not at other times.

Dr. Donné found forty to eighty parts of lime in common urine, while only thirty parts or less were found in the urine of pregnant women.

If a precipitate be made with a solution of baryta in urine of non-pregnant women, twelve to fifteen parts of the salts of baryta will be precipitated, while in pregnant women the urine will give but five to eight parts. Of thirty-six cases of doubtful pregnancy, Donné was only deceived twice by these tests, and Lubaniski detected three cases where all other means had failed.

Now we have shown that pregnancy has a decided influence on the urine, and it now remains to review the various alleged differences in the urine of a woman pregnant with a boy from that usual in women who are pregnant with a girl, from a due consideration of which it is contended that the sex of the fetus in utero may be predicted.

In nearly all the older books on the urine, a chapter is set apart on the prediction of the sex of the unborn child by an inspection of the urine of the pregnant woman, as may be seen from the following, in which this far-seeing wisdom is ridiculed. "After what manner (if divers pisse-messengers come together) they must be examined: How to show (by the urine) the sex, whether a woman be with a child or no, how long it is since she conceived of it, and whether she shall bring forth a boy or a girl, although the urine show none of all these," Chap. VI., p. 80.²

Fletcher³ (p. 72) gives the following signs of "conception in

¹ Du Diagnostic de la Grossesse par l'Examen d'Urine, 8vo, Paris, 1842, p. 79.

² Brian (M. Parlt): The Pisse-Prophet, or certain Pisse Pot Lectures, 12mo, London, 1637-1679, German transl. Hamburg, 1693, 1723.

³ Fletcher: The Differences, Causes, and Judgments of Urine, According to the best Writers thereof both old and new, 8vo, Lond., p. 124, 1641.

women. Settling down of the sediment, which if they be red, through greater abundance of heat and blood, a male child is conceived. If white through less abundance of heat and blood, a female child is conceived.

“1. Motes in the sediment red and round, signify a male ; but motes white and round, a female.

“2. Milke [in conception of male] commeth sooner into her breasts, which being milked, and set in a glasse in the sunne, it waxeth hard into a stone, not unlike a bright pearle.

“3. All her right side is better and more lusty than her left, right eye fairer, right pap greater with milke, the pulse of her right artery swifter.

“4. If a woman's urine be kept three days in a glass bottle stopped, and after strain it through a fine, cleane linen cloath, if there appeare little quicke living creatures, and red, a male is conceived, if white a female.

The “urine of a woman that is with chylde, her water shall have some cleare strykes, the most parte shall be troubled, and the troublennesse shall be reedysche, in the manner of tawney, and this token shall never fayle, as soon as the chylde hath lyfe, and if it be a gyrle, the troublennesse shall draw downwards and if it be a boye the troublennesse shall have above.”¹

While the composition of the urine of a woman pregnant with a boy is probably different from that of a woman pregnant with a girl, and easily demonstrable, yet it is too much to expect that it should be so invariably (owing to a difference in temperament, diet, age, kind of nourishment, etc.), that the sex of the child could usually be predicted by such a test.

On the other hand, we feel persuaded that, should the urine of a sufficient number of women, pregnant with boys, be compared with an equal number in same condition of life, temperament, etc., pregnant with girls, there would be found an appreciable difference in its composition, density, quantity, color, etc., sufficient to show that the sex of the fetus in utero has a perceptible influence in determining the character, composition, and quantity of the urine secreted during pregnancy, thus affecting the physical condition of the mother during gestation.

¹ Here beginneth the seigne of the uryne, etc., 16mo, Lond., 1552, p. 32.

8. *Influence of Sex on Production of Edema of Vulva and Members.*

THE curious and popular book of Albertus Magnus, "*De Secretis Mulier*," is full of wisdom on the subject of the signs of conception, by which a male may be distinguished from a female, as the following words of his translator¹ abundantly testify: "We shall now proceed and communicate to the world what are the signs or indications of a man or woman child, and what I shall here lay down may be depended on as certain. If a woman has conceived of a boy, the color of the face will be red, and her motion will be light and easy. A second sign of a boy is if the belly swells on the right side and grows round and plump. Thirdly, if the milk of a woman's breast be thick and well digested, so that when it is dropped upon anything that has been well rubbed it keeps close in its body and does not separate or divide itself, then you may depend upon it that such a woman has conceived of a boy.

"Fourthly, if the milk so digested, or if a drop of blood drawn from the right side be put into clear water or into urine and sinks directly—that is, perpendicularly—to the bottom, this is a sign of a male child. But if it floats or swims at the top or upon the surface of the water, this is a certain sign of a female."

[Some of these tests are resorted to at the present time in Italy in selecting a wet-nurse to test the quality of the milk—not by old women, but by professors of obstetrics, such tests having been witnessed by the author in 1874.] The right breast is said to be larger in conceptions with males.

"Sixth, when a woman, as she begins to walk, moves the right foot forward and not the left, it is a male child, and the contrary when it is a female."

Aristotle, B. vii., says that "those that are pregnant with a male fetus, usually pass through the time more easily, and retain a better color throughout. If a female is conceived, the contrary is the case; for they are generally more discolored, and suffer more during the period of gestation. In many cases

¹ John Quincy, M.D., Translation of Albertus Magnus, 8vo, London, 1725, pp. 83-85.

the legs swell, and a swollen condition of the flesh is also common. In some women, however, the condition is the contrary; pregnant women are apt to have all sorts of fancies; these are strongest when a female is conceived."

Pliny, N. Hist., B. vii., Ch. 5, says that with a female conception "the mother experiences an almost insupportable weight, there is a slight swelling of the legs and groin, and the first movement of the child is not until the ninetieth day."

Concerning the swelling of the legs and groin mentioned by ancient authors, it is clearly a difficult matter to decide whether it occurs more frequently in case of gestation with girls than with boys, as one is seldom called upon to treat such a condition in the human female. However, in the case of phlegmasia alba dolens it would be interesting to determine if this condition were more frequent in female births than in those of males. As tending to confirm the alleged swelling of the groin in female conceptions, M. Lemoal, of Rennes, France, has observed that the "bearing" or vulva of cows was perceptibly more swollen in the case of those that afterwards gave birth to female calves than in the case of those that gave birth to males, so much so that he was always able to predict the sex of the calf by observing the "bearing."

9. *Influence of Sex of Fetus on Inoculating the Mother with the Constitutional Peculiarities of the Paternal Organism.*

It is a well-known and undisputed fact that the fetus in utero inoculates the mother during gestation with physical peculiarities of the male by whom she was impregnated, and is liable to imprint one or more of such peculiarities on her subsequent offspring, even when by another father.

Now, we wish to determine whether the male or female fetus has the greater influence in thus inoculating the mother.

The generally-received opinion, as taught by Aristotle, Hippocrates, and other authors—and elaborated in an interesting article by the author of this paper,¹—is that the female children

¹ The Law of Transmission of Resemblance from Parents to their Children. N. Y. Med. Rec., 1874. See Dr. Harvey, Monthly Journ. Med. Sci., 1849-50; also, Sedgwick, Med.-Chir. Trans., 1861-2.

resemble more their father than their mother, and the males incline more to their mother than to their father.

Presuming this to be true, we would infer that, as females resemble their father more than their mother, they would engraft on the mother more of the peculiarities of the father than would a male conception. The greater extent of placental connection in the former case would also favor this view, though the greater length of gestation with males might interpose a modifying influence. I am therefore inclined to believe that female conceptions impress the mother more than the male with peculiarities of the father, as we have shown that the former impresses her physically more.

10. *Influence of Sex of Fetus on the Duration of Gestation.*

Professor Hamilton, in his paper,¹ has stated that "he has ascertained by facts which are incontrovertible, that the more calves the cow has had the longer is the duration of her pregnancy," while Tessier declares with equal pertinacity that he has ascertained beyond doubt that the duration of gestation "is not affected by the age, constitution, or food of the animals; nor by the size, strength, or sex of the fetus,"² but more recent investigations have at least rendered doubtful the truth of his conclusions in these latter respects.³

Sir E. Home mentions the fact that where animals of different species breed, the period of gestation is the longest time of the two; "the mare covered by an ass goes eleven months; and the ass covered by the horse goes *eleven months*, although *ten is her usual period*."⁴

On the authority of Herman Von Nathusius,⁵ cited by Darwin,⁶ we are told "that Merino and Southdown sheep, when both have long been kept under exactly the same conditions, differ in their average period of gestation, as seen in the following table:

¹ Philos. Trans., 1822.

² Montgomery, Signs, etc., of Pregn., p. 532.

³ Mém. de l'Acad., p. 15 et seq.

⁴ Prac. Obstet., p. 109.

⁵ Animals and Plants under Domestication, Vol. 1, p. 97.

⁶ Transl. in Bull. Soc. Imp. d'Acclimat., tome ix., 1862, p. 723.

Merinos,	150.3 days.
Southdowns,	144.2 “
Half-bred Merinos and Southdowns,	146.3 “
Three-quarters blood of “	145.5 “
Seven-eighths “ “ “	144.2 “

“Nathusius remarks that, as Southdowns grow with remarkable rapidity after birth, it is not surprising that their fetal development should have been shortened.”

It appears that domestication and high breeding shortens the period of gestation, according to these two observers.

Mr. F. Burke,¹ in reciting the results of M. Tessier's experiments concerning the period of gestation in cows, says: “In most cases, therefore, between nine and ten months may be assumed as the usual period; though with a bull-calf she has been generally observed to go about forty-one weeks, and a few days less with a female.”

Of twelve cows observed by Dr. Nicolls,

1 went	276 days.
1 “	279 “
2 “	282 “
1 “	283 “
1 “	285 “
2 “	286 “
1 “	288 “
1 “	293 “
1 “	295 “
1 “	303 “

12

“It will be observed here that six, or one-half of the whole number, exceeded the ordinary period of 285 days; and of these six calves four were bulls. Dr. N. observes that ‘according to this record the bull calves were carried from one to three weeks longer than the heifers.’

“With regard to any influence or relation between the sex of the offspring and the prolongation of the gestation, Lord Spencer thinks there is some foundation for the opinion; since

¹ *British Husbandry*, Vol. ii., p. 438.

it appears that from the cows whose period of gestation did not exceed 286 days, the number of cow-calves produced was 233, and bull-calves 234; while from those whose period exceeded 286 days the number of cow-calves was only 90, while the bull-calves was 152.

"Lord Spencer having subsequently bought another bull, found that of sixteen cows impregnated by this bull, which was aged, the average period of gestation was $290\frac{1}{4}$; and of fifty-nine other cows in calf by this bull, the average period was 288 days; or, taking the whole seventy-five cows, the average was $288\frac{1}{2}$, an excess of about four days over the ordinary period. His lordship also observes that while of the 764 cows first kept account of, 185 went less than 281 days, *not one* of the seventy-five cows in calf by this bull did so. And again, while only one-seventh (111) of the same 764 went above 289 days, between one-third and one-half (twenty-nine out of seventy-five) of those covered by this new bull went above 289 days."

Mr. C. N. Bement,² of Albany, N. Y., published the result of his observations on the period of gestation in cows, in 1845, which has been tabulated by Dr. Beck.³

	Average period of gestation.			
In 1839 three cows produced heifer calves, 284 days.				
1840 six cows	"	"	"	287 "
1841 eight cows	"	"	"	286 "
1842 four cows	"	"	"	284 "
1843 five cows	"	"	"	282 "
1839 eleven cows	"	bull	"	280 "
1840 seven cows	"	"	"	299 "
1841 three cows	"	"	"	293 "
1842 nine cows	"	"	"	287 "
1843 six cows	"	"	"	282 "
62 cows average	.	.	.	285 "
36 cows, average time with males,	.	.	.	288 "
26 " " " " females,	.	.	.	282 "

The shortest period was 213 days, and the longest 336, a difference of 123 days.

As the cow is in heat every two weeks, and varies on an

¹ Montgomery, Signs, etc., of Pregnancy, p. 531.

² Cultivator, July, 1845; cited in Amer. Jour. Med. Sci., Oct., 1845.

³ Medical Jurisprudence, 1850, vol. i., p. 576.

average six days in the duration of gestation of males and females, and as the human female is in heat every four weeks, and varies about twelve to fourteen days in the average period of gestation for males and females, we can readily see the analogy, and deduce the law, that is, the difference in the duration of gestation with a male fetus is one-half the intermenstrual period longer than with a female.

The period of gestation in the same woman with a fetus of the same sex may vary from several circumstances, among which I may mention: age, state of health, number of pregnancy, whether living with her husband or not, frequency of intercourse, emotions of fear, grief, joy, etc.; age, physical condition, etc., of the father of her child.

This difference in the duration of pregnancy, where it goes beyond the usual period, is clearly independent of the sex of the fetus, though we have shown that in cases of protracted gestation there is usually an excess of males. Lord Gardner, in the famous Peerage Case, had a son born 312 days after his absence from his wife, who was decided to be legitimate.

“There is a prevalent belief among farming men, and I believe, farmers, that, when the time of gestation of a cow is longer than usual, the produce is generally a male-calf. I confess I did not believe this to be the case, but this table shows that there is some foundation for the opinion. In order fairly to try this, the cows which calved before the 260 days, and those which calved after the 300th, ought to be omitted as being anomalous cases, as well as the cases in which twins were produced, and it will then appear that, from the cows whose period of gestation did not exceed 286 days, the number of cow calves produced was 233, and the number of bull calves 234; while from those whose period exceeded 286 days, the number of cow calves was only 90, while the number of bull calves was 152.”

As Earl Spencer considers 284 days as the usual period of gestation in the cow, and as his figures show that an equal number of each sex born of cows whose period is 284 days, it is only fair that the relative proportion of male to female births should be shown from this period; then we should have from the 284th to the 300th day, 141 cow calves (37.7 per cent), to 33 bull calves (62.3 per cent). If this same method be pur-

sued in calculating the births from the 260th to the 284th day, we find 149 cow calves (55.3 per cent), against 120 bull calves (44.6 per cent).

We have taken the trouble to separate the sexes of the calves given in the tables¹ of Lord Spencer, and find that the average duration of gestation of all the cows that gave birth to heifer calves was 282.7 days, whereas the bull calves were carried 285.1 days, as will be seen from the following table, viz.:

Total number of cows, 764.

Bearing heifer calves, 354;	average dur. of ges.	282.7	} 283.9
“ bull “ 401;	“ “ “	285.1	
“ twins, both heif., 7;	“ “ “	277.6	} 276.8
“ “ “ bulls, 5;	“ “ “	274.4	
“ “ cow & bull, 11;	“ “ “	278.3	

Proportion of males to females in single births, 115.3 to 100.

“ “ “ twin “ 84 to 100.

Average duration of gestation, single births, 283.9 days.

“ “ “ multiple “ 276.8 “

From an examination of the preceding table it will be seen that the average duration of gestation, when more than one fetus is carried, is seven days shorter, and that twin bulls are carried $10\frac{1}{2}$ days less than a single bull. As the male fetus is heavier than the female, from what we have noted above it is clear that the total weight of the fetal mass has a decided influence on the duration of gestation—shortening it considerably when that mass is excessive in bulk.

M. Gaston,² in his researches on the duration of gestation, found that boys were carried from two to seven days longer than girls, as may be seen from the following table:

PRIMIPARÆ (AVERAGE).

Cases.	Age Mother.	Dur. Mens.	Dur. Gest.	Wght. of Child.
10	23	5.45	276.2	3145 gm. boys.
21	22	4.60	274.4	3151 “ girls.

MULTIPARÆ (AVERAGE).

12	29	4.5	285.2	3280 gm. boys.
18	26	5.1	277.6	3250 “ girls.

In nearly 800 cases recorded in the obstetrical wards of the

¹Journal of the Royal Agricultural Soc., 1840, vol. i., pt. 2, p. 165.

²Nouvelles Recherches sur la durée de la grossesse, ses rapports avec la conception, l'ovulation et la menstruation. 8vo. 1876.

Philadelphia Hospital, I found, from a careful tabulation of the cases, that the duration of gestation was on an average always longer with male children than with female—as may be seen by an examination of the following table :

WITH GIRLS.		MONTHS.	WITH BOYS.		MONTHS.
168 cases first pregn'y,		8.87	153 cases first pregn'y,		8.95
48 " first "		8.81	54 " first "		8.92
51 " second "		8.85	17 " second "		9.03
44 " second "		8.97	44 " second "		8.98
<hr/>			<hr/>		
311 " 1st & 2d "		.87	268 " 1st & 2d "		8.97

or $\frac{1}{100}$ of a month (3 days) longer with boys than with girls.

Ravn found in 40 cases that the average number of days from conception to quickening was 134 with boys and 149 with girls; while the average duration of gestation in 150 cases was 277.4 days for boys and 276.7 for girls. For the year 1854, boys, 278.8; girls, 272.8. 1855, boys, 279.9; girls, 277.7.

The ancients having discovered that females were carried in the womb a longer time than males before quickening, reasoned from analogy that gestation lasted ten months with girls, whereas it was but nine months with boys.

Bonaventura, the author of a curious and rare book as large as a family Bible, of which I am the fortunate possessor of a copy, with much learning spread over nearly a thousand pages, to prove that eight months is the natural period of gestation in the human female, against the vulgar opinion, argues in the opposite way, from effect to cause, maintaining that boys are more slowly formed than girls, and that is why they are carried longer—as may be seen from the following:

“Hoc posito sequitur, verisimè à D. Thoma dictum esse, masculi materiam majori, ac multiplici terminatione indigere quàm fœminæ materiam; hoc n. non universaliter pronunciat D. Thomas, nâ sic à veritate, ac preceptore dissentiret, cùm mas brevior tempore formetur in utero quàm fœmina, ut superius vindimus, potissimumque; libro tertio, et sic minori indigeat terminatione. . . .

“Id est et inter mares natura fœminam referentes, et inter fœminas marem. Unde verè in partu hoc, de quo agit D. Tho-

¹ Om Svangerskabstidens Graendser, 8vo, Kjobenhavn, 1856, pp. 31, 36.

mas, cunctabitur mas tardius conformatus, proindeque tardius veniens in lucem quam sua natura patiatur.”¹

By way of variety in opinion we may cite Valesius, *Sacræ Philosophæ*, who maintains that because we admit that the male is sooner formed than the female, it does not follow that gestation is shorter with the male, but that what the female loses in slowness of formation up to the period of quickening, she makes up by greater rapidity afterwards, and is born after gestation of equal length with the male, as may be gathered from the following:

“Necesse est ergo fœminæ quam mares tardius accipiant figuram et moveantur; non tamen proinde et tardius edantur in lucem, sed eisdem temporibus quibus mares; quia quanto tardius accipiunt figuram, et moveatur, tanto, postquam formata sunt, citius veniunt ad incrementum.”

11. *Influence of Sex on the Position and Presentation of Fetus.*

Gorræus, in his *Annotations on Hippocrates* concerning the Seed, says that hitherto all men have followed Hippocrates, who teaches that the position of the fetus in the womb is the same whether it be a boy or a girl, except that “the male hath this difference with the female, that he is turned with the fore part of his body towards the *abdomen* of his mother; but with his back part leaning upon his mother’s back.

“But the female has the contrary situation, which undoubtedly appears evident at the birth, which, when it comes, after the child is turned, the male seems for the most part to come forth and exhibit itself with the face turned towards the backbone and *podex* of the mother, but the female after a different manner.”

Mercurio² gives illustrations of the position and presentation of the fetus at the time of birth according to the sex. On page twenty-seven, he illustrates “Il sito del parto naturale, nel quale nascono così i maschi come le femine rare volte. [The natural presentation, in which males are born, as are also the females on rare occasions. This is the head-first, occipito-posterior position.]

¹ Bonaventura, F.: *De Natura Partus octomestris, adversus vulgaram opinionem*. Libri decem, 944 + 40 pp. folio. Venetiis, 1602. Lib. 9, Cap. xliii., p. 841.

² Scipio Mercurio, *La Commare*, 4to, Venice, 1642.

On page twenty-eight he gives an illustration of "Il sito del parto naturale, nel quale nascono così i maschi come le femine per lo più." [The natural presentation, in which males are (sometimes) born, as are also the females for the most part.] This is the head-first, occipito-anterior position.

Now, whether there is any truth in this assertion of Mercurio I am not prepared to state, as statistics of labor do not usually separate the sexes in head presentations. It is quite probable that the fact of the female fetus being smaller than the male would exert some influence on determining the presentation or causing a difference in the frequency of the same presentation in the different sexes.

Physicians and philosophers in all times have taught that the male fetus is usually to be found on the right side of the uterus, and the female on the left—or that the uterus inclines to the right side of the body with a male, and to the left side when carrying a female. This is probably not as invariable as they would have us believe, for Schuré, p. 389, found that the fetal heart was heard 238 times on left side, and 141 times on the right, and Jacquemier found the pulsation 34 times on the left and 22 on the right.

12. *Influence of the sex of the fetus on the duration of labor in general, and as causing painful, protracted, difficult, and fatal labors in particular.*

Statistics show in ordinary labors the duration of all the stages combined is greater with male children than with female, as may be seen from the following, elaborated by the author from the register of the Philadelphia Hospital.

PRIMIPARÆ.

153 males.	20.21 hrs.,	weight,	7 lbs. 7.3 oz.	Single women.
54 "	20.36 "	"	6 " 14.8 "	Married "
168 females.	17.41 "	"	6 " 13.2 "	Single "
48 "	16.26 "	"	6 " 7.3 "	Married "

MULTIPARÆ (2D LABOR.)

17 males.	11.03 hrs.,	weight,	7 lbs. 12. oz.	Single women.
44 "	13.30 "	"	7 " 12.5 "	Married "
51 females.	16.16 "	"	7 " 9. "	Single "
44 "	11.18 "	"	7 " 7. "	Married "

Sir James Y. Simpson, in his memoir,¹ shows that "of mothers that die under parturition and its immediate consequences, a much greater proportion have given birth to male than female children."

From Dr. Collins'² book in which 16,654 births are recorded, he finds that of 154 women dying in childbirth, 105 gave birth to male children and 49 to female children, or as 214 male births to 100 female.

The second proposition of Dr. S. is, that "among labors presenting morbid complications and difficulties, the child is much oftener male than female."

The following table will show the number and proportion of sexes of those cases included under the second category.

NATURE OF COMPLICATION.	TOTAL CASES.	NO. MALE CHILD'N	NO. FEM. CHILD'N	PROP. OF ³ MALES TO FEMALES.
Tedious labors.....	109	65	54	148 to 100
Convulsions.....	28	17	11	153 to 100
Puerperal fever.....	88	54	34	161 to 100
Rupture of uterus.....	34	23	11	207 to 100
Post-partum hemorrhage.....	44	31	13	240 to 100
Corceps cases.....	24	16	8	200 to 100
Frotchet cases.....	74	50	24	208 to 100
Total.....	401	256	155	165 to 100
Placenta previa.....				
Extrauterine gestation.....				

Comparative size of male and female fetal head.

Dr. Clarke gives the following measurements of sixty male and 60 female children at birth.

	AVERAGE CIRCUMFERENCE OF HEAD.	AVERAGE DIMENSIONS FROM EAR TO EAR.
In male... ..	13.983 inches.	7.429 inches.
In female... ..	13.617 "	7.221 "
	0.366 inches.	0.208 inches.

1. "The head of the male infant, when measured across from

¹ Memoir on the sex of the child as a cause of difficulty and danger in human parturition. 8vo, pp. 55, Edinb., 1844. From Edinb. Med. and Surg. Journ., Oct., 1844.

² A practical treatise on midwifery, containing the result of 16,654 births occurring in the Dublin Hospital during a period of seven years, commencing Nov., 1826. 8vo, London, 1836.

³ There is an element of error in this proportion arising from the fact that in the general births there were 106 males to 100 females, involving a reduction of six per cent.

ear to ear, over the fontanelle, is about $2\frac{3}{4}$ lines, or nearly two eighths of an inch greater than the female.

2. "In circumference, the head of the male is $4\frac{2}{3}$ lines, or almost precisely three-eighths of an inch greater than that of the female. Hence,

3. "The *transverse* diameter of the male head is nearly one eighth of an inch greater than that of the female child."

Simpson deduces from the figures of Dr. Clarke that the proportion of the surface of the head of the male new-born child to that of the female is nearly as nineteen to eighteen, or the surface of the head of the female is one-nineteenth part less than that of the male.

Professor Reid found the weight of the

Brain of 53 adult males to be 3 lbs. 2 oz. $3\frac{1}{2}$ dr.

" 34 " females " 2 " 11 " $8\frac{1}{2}$ "

Average difference, . . . 5 oz. 11 dr.

Professor Tiedeman states that the female brain weighs on an average eight ounces less than that of the male, "and this difference is already perceptible in the *new-born child*."

Tiedeman says that the weight of the brain of a new-born child is relatively to the weight of the body as one to six, while in the full grown adult it is as one to forty, or nearly seven times greater in the child than in the adult.

According to Braxton Hicks:—"At birth the skull of the male head is in a more advanced state of ossification than that of the females. This is so noticeable that, before the child is born, one is able to pronounce rightly in eight out of ten cases whether it be a male or female.

Dr. Clarke² attempts to explain the assumed greater mortality of male fetuses *before* birth than female, by saying that they are of larger size, and consequently more difficult of delivery, and their greater liability during their intrauterine life to disease and debility, from their requiring, in consequence of their size, more actual nourishment from the mother than smaller female children stand in need of.

Quetelet³ also tries to explain the same matter by saying

¹ British Medical Journal, April 17th, 1877.

² Observations on some causes of the excess of mortality of males above that of females. Philos. Trans., 1786, p. 353.

³ Treatise on Man, p. 25 and 30.

that "It appears beyond doubt that there is a particular cause of mortality which attacks male children by preference, before and immediately after birth. It will be interesting to investigate the causes of a circumstance which is so unfavorable to the male sex."

"If," he continues, "we were desirous of guessing at this point, we might say, with those who suppose that a male conception requires a certain excess of energy in the woman, that this excess of energy was absent or wanting during the growth of the fetus, and that energy failing, the child would suffer more from it if a boy than if a girl. Hence the proportion of dead births between the sexes," etc.

Dr. Graves¹ also contends "that a *greater* mortality before birth prevails among males than females."

Dr. Simpson contends that it is fallacious to assume that a greater number of males than females are dead before labor commences.

This he sets forth in the following table taken from the statistics of Dr. Collins:

STATE OF CHILDREN.	TOTAL CASES.	MALE.	FEMALE.	PROP. OF MALES TO FEMALES.
No. of still-born putrid children...	527	257	270	95-100
" " at full term & putrid	296	148	148	100-100
" " premature still-births	293	146	147	100-100

Dr. Simpson points out that this table "seems particularly valuable and instructive," as "it demonstrates satisfactorily that the intrauterine morbid agencies (whatever they may be) which act fatally on the fetus before birth, act equally on the female as on the male child; and that it is to other agencies than these that we are to look for the remarkable proportion of male over female deaths which is observable among still-births."

Further on he observes "that of *all* the children that had perished from intrauterine causes, and before the commencement of labor (as demonstrated by their putrid state), the females were even more numerous than the males.

"The whole series of facts prove (contrary to what is generally alleged) that the proportion of male children that die *before* birth is not greater than the proportion of females.

¹ Dublin Med. Jour., about 1836 or '7.

Indeed, if we deduct the usual six per cent for the normal over-proportion of males, the ratio of girls dying before parturition would be found to be greater than that of boys—a conclusion which the first column would seem to go far to corroborate and strengthen, for in that computation the number of the dead females distinctly and considerably exceeds that of the dead males.

“This result, with regard to the equality of the sexes among putrid and premature still-born children, becomes only the more striking when we couple and contrast it with the fact which we have already brought out, that of the children who are still-born, and *not* putrid, as many as two out of every three are boys. In other words, among the infants that die *before* labor, the females are equal, if not greater, in number than the males. Among the infants that die *during* labor the males are raised to the high proportion of 150 boys for every 100 girls.”

The following table will show more clearly by comparison the influence of the sex of the child on the arrest of development and death of the fetus in utero.

STILL-BORN CHILDREN OCCURRING AMONG 16,654 BIRTHS.

Still-born children not putrid at term dying during part.	No. Males.	No. Females.	Prop. of Males to Females.
594	357	237	151 to 100

STATE OF CHILDREN.	TOTAL CASES.	MALE.	FEMALE	PROP'N OF MALE TO FEMALE
Still-born putrid children.....	527	257	270	95 to 100
Still-born at full term and putrid..	296	148	148	100 to 100
Premature still births	293	146	147	100 to 100
	1,116	551	565	97½ to 100

Supposing equal No. male and female concep-

tions, deduct 6 per cent, 92 to 100

Proportion of sexes in all births, 106 to 100

Contrary, therefore, to the hitherto received opinion, we are forced to conclude that influences which cause the death of the fetus before labor act more frequently on the female than on the male, a fact which would tend to corroborate the view we have taken, viz., that the demands of the female fetus on the mother are greater than those of the male. This is in harmony with the observations of Morgagni and Desormeux, who enter

tain the opinion that female fetuses are more common in abortions than males.

Dr. Simpson is of the opinion that the excessive mortality of males in childbirth is due solely to the fact of the larger size of the fetal head of males; while this is true as far as it goes, in searching for a more proximate cause, we are persuaded that should a given number of male fetuses be subjected to a certain pressure and detained for a certain time in the maternal passages, and the same number of females *of exactly the same size and conformation of head* be subjected to exactly the same conditions in labor, the mortality would still be somewhat greater among the males than among the females, on account, as we believe, of the greater development and more sensitive organization of the male brain.

Females are less susceptible to noxious and morbid influences than males, as is seen in cases of deaths from asphyxia from carbonic oxide gas, the male dying first; and where there have been two individuals of the same sex, one ill and the other in good health, exposed to the gas from charcoal, the one in good health succumbed first.

Dr. Farre pointed out in the Second Annual Report of the Reg. Gen., that "the diseases of the nervous system are *twenty-three per cent* more fatal to males than to females, *the chief difference arising from the diseases which affect children.*" It is worthy of note here, that of all infantile diseases, whooping cough is the only one in which the mortality is exceptionally excessive for females.

Influence of Sex on the Duration of Labor.

Dr. Simpson gives the duration of labor in 427 cases (249 male and 178 female), registered in the Edinburgh Hospital, the average duration of each labor

With male children was, . . . 10 hours and 38 minutes.

With female children, . . . 9 " " 34 "

Av. greater length of male birth, 1 hour and 4 minutes. Cases of speedy labor, say less than three or four hours, are not included in the above.

Dr. Simpson shows from Dr. Collin's tables that the average greater length of the male births with 501 still-births was 2

hours and 17 minutes; in morbidly tedious labors, 3 hours and 6 minutes; cases requiring the crotchet, 4 hours 2 minutes; leading to death of mother, 5 hours 11 minutes.

From this he concludes that "the average duration of labor is longer with male than with female children, and the difference in this respect between male and female births becomes increased in length when the labors become more severe and dangerous in their character."

Bonaciolus and other ancient authors taught that the labor was slower, the pains more continuous but more obtuse, with boys, whereas they were quicker and easier, though more acute, and molested the woman through a greater space of time with girls, as may be gathered from the following:

Plerumq.: verò diluta pallidiusculaq.; sanico si fœmina natum itura est: cruenta, si mas, prefluit. Ceterû maris ac fœmelle partus discrimine illo interstinguntur: Quoniam hujus partus tardior, dolores etiâ continui ac perpetes, sed obtusiores: illius celerior simul et faciliior, ac acriores et longè molestiores dolores.¹

13. *Influence of the Sex of the Fetus on the Site, Weight, and Conformation of the Placenta.*

INFLUENCE OF SEX OF FETUS ON SITE OF PLACENTAL ATTACHMENT.

M. Jacquemier² conceives that, under the operation of a vital cause, the ovum, upon its entrance into the cavity of the womb, has a certain selective power. After the remark that it is found most usually "upon a space a little elevated, to the right or to the left upon the posterior face, next on a corresponding point in the anterior face, next after this upon one or the other sides, sometimes exactly at the fundus, and exceptionally at the neck," he goes on to say: "That it fixes itself there, in obedience to a pre existing, organic attraction, for it is not to be supposed that all parts of the surface (of the uterine cavity) are alike fitted for the development of the placenta. Like the germs of vegetables, it should have a portion which corresponds to radicles, which, in vegetating, direct

¹ Bonacioli Enneas Muliebris, cap. viii

² Manuel des Accouch., vol. i., p. 273.

themselves by a species of elective affinity, toward a determinate point."

The placenta is usually situated at the fundus of the uterus, according to Gusserow and Schröder, on the anterior wall more frequently than on the posterior (lateral insertions are rare), oftener on the right than the left side. The place of insertion has an influence on its form. Placenta previa, ascribed to multiparity, occurred 56 times in 41,169 cases, or 1 in 763.

While the uterus probably prepares at every menstrual period, and certainly at the time of every conception, in obedience to a law of its organization, for the reception of the fecundated ovum, whether that ovum reaches the interior of the womb or falls into the abdominal cavity, yet we know that the fetus in most extrauterine pregnancies develops almost as well as if it were in the womb. In these cases, the placenta is necessarily obliged to attach itself to any part where the fecundated ovum may chance to fall. In these cases, as there is no unusual predetermined vascularity in the point of attachment at the moment it is about to be made, we are left to conclude that the simple presence of the placenta must excite the necessarily increased vascularity at the point of its attachment by sending out radicles which penetrate the vessels of the maternal tissue, much as the radicles of parasitic plants penetrate the bark and reach the sap of trees, from which they extract the greater part of their nourishment. The fact that all this can and does happen is no proof that the preparation for the fecundated ovum, which takes place in the womb, is of no service in determining the site of the placenta in that organ.

There are very few accessible statistics in which the site of the placenta is mentioned, but "of 34 women who died while pregnant or soon after delivery, I found," says Velpeau, "upon examining the parts, that the centre of the placenta corresponded to the orifice of the (Fallopian) tube in 20 cases; it was in front of it in 3 cases, behind it in 2, below it in 3, and in 6 cases only toward the fundus."

From statistics collected from various sources, Read, in his memoir,¹ has constructed the following table, showing the relative frequency of the various attachments of the placenta:

¹ Placenta Previa: Its History and Treatment. 8vo. Philadelphia 1861. P 82.

	Cases.
At the fundus,	16
At the side, or on the anterior or posterior wall,	565
In the vicinity of the os uteri,	145
Over the os,	11
Undetermined,	187

Admitting that the sex of the fetus has an influence in determining the site of the placenta in the womb, and believing that "the attachment of the placenta to any portion of the uterus causes a development of that place which proceeds *pari passu* till the limits of growth in the placenta having been reached, the enlargement is continued, and kept up by the pressure constantly exerted on the uterine walls by the growing contents till the time of parturition" (Read, p. 105), we can readily understand that the development of one particular part of the womb must influence its *shape* and the shape of the uterine cavity. Hence we infer that the position and presentation of the fetus will depend very much upon the *shape* and *inclination* of the uterine cavity. This, then, we may regard as a most important factor in determining the position and presentation of the fetus.¹

Dubois found among 1,915 presentations of the head :

1,355	occipito-iliac left anterior.
491	" " right posterior.
55	" " right anterior.
12	" " left posterior.

"It has long been my practice," says Tuckey,² "whether rightly or wrongly, I know I have never done any harm by the practice, in cases of tedious labors in which I have given ergot or otherwise interfered, to remove the placenta manually after the birth of the child."

"In cases of female children, I have found the placenta to be attached to the left side of the fundus; when the sex is male, on the right side. Over and over again I have found this to be the case. I have listened with the stethoscope be-

¹May not the greater frequency of the O. I. left anterior position be due to the greater frequency of the insertion of the placenta on the right side?

²The Position of the Placenta Relative to Sex. Med. Press and Circular, March 13th, 1878, p. 211; Practitioner, London, vol. xxi., 1878, p. 412.

fore birth, and have ascertained the position of the placenta by the *bruit*, and have settled in my mind the sex of the child, a fact which has afterwards been confirmed on its birth." He cites fifteen cases, six males and nine females, in all of which the placental site was as above.

"Now, I do not mean to argue anything from the fact that in true lateral hermaphroditism, the halves of sex are right and left, male and female. . . . I do not know whether my idea that the right ovary is intended for the production of males and the left for that of females has been thought worthy of proof or the reverse. . . . Yet it seems such an easy solution of the matter."

Having discussed the influence of the sex of the fetus on the site of the placenta in general, it remains for us to inquire into the influence of sex in producing *placenta previa*, a condition that is roughly estimated to occur in one out of every thousand pregnancies,¹ and prove fatal to the mother in one out of five or ten cases. It occurs more frequently in multiparæ than primiparæ, from which medical men infer that it is due to a greater flaccidity of the uterus or larger cervical canal among multiparæ at the time that the fecundated ovum entered and fixed itself in the womb.

The only author whom I have thus far found who has expressed any opinion on the influence of sex in producing *placenta previa* is Silas Hubbard,² and he contends that there should be a larger proportion of female children where *placenta previa* exists, because he is of the opinion (in common with many other authors, ancient and modern) that women conceive with females during or at the finish of the menstrual flow, when the uterus is more relaxed and the cervical canal more patulent; hence female conceptions by simple gravitation would fall to a position nearer the cervix than males, who are conceived during the intermenstrual period, when the cervical canal is narrower.

The following is his (Hubbard's) own explanation. "According to my theories I should expect that in *placenta previa* cases the children are females because, as I have said, the

¹ Schroeder gives 56 cases of *placenta previa* in 41,169 births, or 1 in 763. Collins gives 11 cases in 16,654 births, or 1 in 1,514.

² Buffalo Medical and Surgical Journal, 1855, p. 654.

ovum which grows to be a female is probably fecundated while within the uterus; it therefore seems that it is more liable to form an attachment at the neck of the uterus than if it had been fecundated while within the ovary or Fallopian tube. In this latter case I should expect that the semen had so impregnated it with growing and attaching powers that it would fasten to the uterus as soon as it reached its cavity, and thus it would not be so liable to reach the cervix uteri as if it had been fecundated at a later period when it had advanced much nearer the cervix without attaching powers."

Among the many memoirs and papers I have on placenta previa, and of those I have examined in libraries, very few mention the sex of the child; even those that treat the subject statistically make no classification by sex. In one paper only out of a hundred which I have consulted, have I found any mention of the sex, and in this one, I regret to say that the proportion of sexes does not indicate any influence of sex as a cause determining this condition, though the number is too small to be of much value. There were forty-one boys and forty girls, about the proportion of sexes in births in general.¹

Though placenta previa has generally little disposition to reappear in successive labors, yet a very remarkable instance of its recurrence in fifteen successive labors is recorded by Read, p. 140. The woman began child-bearing at eighteen years of age, and continued at intervals of eighteen and one-half months, until she was forty-five, to give birth to children, complicated in each instance by placenta previa.

In this case there was a permanent cause, whether it was mechanical or constitutional.

The following ancient wisdom concerning the cord may not be uninteresting. Joubert² says that there is a popular opinion that the number of nodes or wrinkles in the umbilical cord of the child of a woman who has just given birth, indicates the number of children that the woman is still destined to have. If the nodes are far separated the children will be born at greater intervals than when these nodes are near together. If these nodes are black or red, she will have as many males,

¹ Hartcop: Achtzig Fälle von Placenta Previa, 12mo, pp. 36. Berlin, 1872, p. 32.

² Erreurs populaires touchant la Conception et Génération, p. 157. 8vo Paris, 1587.

if white, female. Antoine Garnier had the temerity to say in his practice (Chap. 31, *Malad. d. l. Matrice*) that in his time he found by experience that all this was true. The explanation given by Joubert of the significance of these signs is that the greater the number and prominence of these nodes or twistings together, the red or dark color indicates that the uterus is robust, hot, well-tempered, and not humid, and hence in the best possible physical condition, and consequently best suited to the production of males.

According to Joubert, p. 154, the midwives in olden times, careful of the preservation of the human race, earnestly remonstrated and charitably required of their professional sisters, when it was a boy, to give him a good measure of cord between the belly and the ligature, for they thought that the virile member took after its *patron*, and that it would become larger in proportion to the amount of cord left dangling from the belly. If the cord were tied too near the belly, the bladder would be elevated and the penis shortened by being drawn inwards. In the girls, on the contrary, they taught that it was an advantage to cut the cord short, as such a procedure held the womb up in place and tended to prevent displacements of that organ.

Influence of Sex of Fetus on the Size, Weight, Shape, Structure, and Composition of the Placental Mass.

The size, weight, shape, and composition of the placenta are known to vary greatly, and much more frequently than any organ of the body. There are exceptional cases where small children have large placentæ, and large children have small placentæ. Again, various kinds of degeneration take place in this body, such as fatty, calcareous, etc., all these conditions due to causes as yet unknown. We expect to be able to show that the size depends, to a certain extent, upon the site of attachment, as the fundus, being the most natural site, affords better opportunities of development than the cervix. I cannot find a more appropriate place than this to mention the fact that this paper owes its origin entirely to the discovery, by its author, of the fact that *nature has provided less placental mass (by weight) to nourish a given amount (weight) of male fetus than to nourish the same amount of female fetus, or, in other words,*

the placenta of the female fetus is heavier in proportion to the weight of its fetus than that of the male is to its fetus.

"It is undoubtedly true," says Read, p. 85, "for obvious reasons, that taking the average of any large number of cases, the heavier the child, the heavier will be the placenta, but the same facts which prove this also prove that there is no agreement between their weights in individual cases, and that for children of a certain size the variation of the weight of their placenta will be between very wide extremes, showing most conclusively that there is no regular parallelism between their growth."

Read found, in 338 cases taken without selection, the following relative weights of placenta to fetus:

MEAN OUNCES.				AVERAGE MEAN POUNDS. POUNDS.	
19	placentæ weighed	12.	Children weighed	3½ to 9½.	5.31.
39	"	16.	"	2 " 10.	6.86.
105	"	20.	"	4 " 10½.	7.89.
82	"	24.	"	3½ " 10½.	7.85.
30	"	28.	"	6 " 13½.	8.13.
21	"	32.	"	7 " 12½.	9.28.
4	"	36.	"	7 " 11½.	8.25.
4	"	40.	"	6½ " 12½.	9.12.

It is conceded by all authors that usually the fundus of the uterus is the first to develop in pregnancy, and that the cervical portion begins to develop only when the seventh month is reached; now, may not the fixation of the placenta about the cervical portion of the womb, from the restricted space here, as compared with the fundus, prevent the placenta from attaining its full size and weight, and may we not say that the size, weight, and conformation of this organ are dependent, in a great degree, to its site in the uterus? And this is why we see such discrepancies between the weight of the fetus and its placenta.

Now we come to the influence of the sex of the child on the weight of its placenta, as compared to the weight of the fetus itself—a comparison (by sexes) not hitherto made, at least so far as we know. The average weight of the human placenta is about five hundred and fifty grams, based on fifteen thousand observations.

The umbilical cord and fetal membranes weigh, according to the best authorities, from sixty to eighty grams, say a mean of seventy-five grams in the case of boys, and sixty-five grams in the case of girls.

We know, by actual measurement, that the umbilical cord in children of primiparæ is, on an average, one centimetre shorter for girls than for boys (based on six thousand nine hundred and fifty-eight observations), and two centimetres shorter among the girls than among the boys of multiparæ (based on eight thousand six hundred and forty-nine observations).

Not having any statistics of the comparative weight of the membranes of male and female fetuses, we are forced to conclude that they are larger and consequently heavier in the case of males than with females, because the male fetus is larger.

Now, having determined that the cord is longer by a mean of one centimetre, or one-fifty-third of its whole length, and the membranes larger and hence heavier, in the case of the male fetus, by—say a total excess of five grams (excessive weight of membranes and cord combined), in primiparæ.

Among the eight thousand six hundred and forty-nine multiparæ, we know, by actual measurement, that the mean average length of the umbilical cord of the male fetus exceeds that of the female by two centimetres, or one-twenty-seventh, and that the mean weight of the male fetus exceeds that of the female by two hundred and fifty-two grams, or one-thirteenth. If it be true, then, that the membranes alone weigh seventy-five grams, we must subtract one-thirteenth of this weight, or, roughly, six grams plus the weight of two centimetres of cord, or two grams; in all, say eight grams from the total weight of placenta, *with membranes and cord*, in order to justly compare the weight of the *naked placenta* of the male with the *naked placenta* of the female.

We pursue this plan, because the weights given by Tarnier undoubtedly include the membranes and cord with the placenta, and, as we do not know exactly how much to subtract from this gross sum to arrive at the weight of the *naked placenta*, we subtract from the total average weight of placenta, membranes and cord, what we have calculated to be the excess

of weight of membranes and cord of males over that of females, viz., three grams in the case of children of primiparæ, and eight grams in the case of the children of multiparæ. Hence the following figures,¹ with the above excess eliminated:

Primiparæ at Term (Actual Measurement).

No. observations.	Weight.	Length.	Weight.
3,794 boys; placenta,	527 gms.;	cord, 54 cm.;	child, 3,146 gms.
3,164 girls;	“ 529 “	“ 53 “	“ 3,101 “

Multiparæ at Term (Actual Measurement).

4,623 boys; placenta,	548 gms.;	cord, 55 cm.;	child, 3,371 gms.
4,026 girls;	“ 540 “	“ 53 “	“ 3,120 “

15,607

Table *Corrected* by Eliminating *Excess* of Cord and Membranes with Males.

Primiparæ.

No. observations.	Weight.	Length.	Weight.
3,794 boys; placenta, [524] gms.;	cord, [53] cm.;	child, 3,164 gms.	
3,164 girls;	“ 529 “	“ 53 “	“ 3,101 “

Multiparæ.

4,623 boys; placenta, [540] gms.;	cord, [53] cm.;	child, 3,372 gms.	
4,026 girls;	“ 540 “	“ 53 “	“ 3,120 “

Table Showing Relative Weights of Placenta, *Assuming Girls to be as Heavy as Boys.*

Primiparæ.

3,794 boys; placenta, 527 gms.;	weight of boy, 3,164 gms.	
3,164 girls;	“ [537.7] “	“ girl, [3,164] “

Multiparæ.

4,623 boys; placenta, 548 gms.;	weight of boy, 3,372 gms.	
4,026 girls;	“ [592.2] “	“ girl, [3,372] “

Primiparæ (Corrected).

Boy's w't, placenta, 524 gms.;	1 gm. placenta produces 6.03 gms. boy.	
Girl's “ “ 529 “	1 “ “ “ 5.86 “ girl.	

—17

¹ Elaborated by the author from the tables of M. Tarnier, for sixteen years, 1860-76, at the Maternité, Paris, out of Dict. Encyclop. des Sciences Médicales. 8vo. Paris, 1878. Mot Fetus, p. 487.

² The above figures are obtained by proportion, as follows: If 3,101 grams of fetus require 529 grams of placenta to nourish it, how many grams of placenta will 3,164 grams of fetus require? 3,101 : 529 :: 3,164 : 537.7.

Multiparæ (Corrected).

Boy's w't, placenta,	540 gms.,	1 gm. placenta produces	6.24 gms. boy.
Girl's " " "	540 " "	1 " " "	5.77 " girl.
			—47

Primiparæ (Corrected).

To produce each gram of male fetus it requires.....	.1656 gms. of placenta.
To produce each gram of female fetus it requires1705 " " "
Excess of placenta required to produce	—
1 gram of female fetus.....	+ .0049 " " "

Multiparæ (Corrected).

To produce each gram of male fetus it requires.....	.1601 gms. of placenta.
To produce each gram of female fetus it requires.....	.1730 " " "
Excess of placenta required to produce	—
1 gram of female fetus.....	+ .0129 " " "

We have, therefore, clearly shown that, for every gram of female fetus, a greater weight of placenta is required to nourish it than for the same weight of male fetus.

We have also shown that, notwithstanding the greater average weight of the male fetus, yet the placenta of the female exceeded that of the male by one-fifty-second of its own weight in the case of primiparæ, and by one-fourteenth in the case of multiparæ.

The placenta, being so much heavier in the case of the female fetus, is necessarily larger, and consequently has a larger surface of attachment to the womb—a fact which we expect to help us to explain the reason for the Mosaic law (Leviticus, chap. xii., verses 2, 4, 5) which required a considerably greater length of time for the purification of women who had given birth to female children.

14. *Influence of the Sex of the Fetus on the Quantity, Quality, and Duration of the Lochial Discharge.*

Every woman, after the birth of a child, has, for a certain number of days, a sanguinolent and serous discharge from the genital organs, varying in quantity, quality, and duration, according to her age, temperament, social condition, number of pregnancy, condition of health, accidents of parturition, and

sex of the child. The greatest factor, in its influence on the flow, is that of lactation—those who do not nurse lose 1,880 grams, while those who give suck, lose only 1,085 grams. From this, it is fair to infer that the temperament of the mother exerts a great influence—those most humid losing more than those of a dry nervous temperament.

According to Gassner,¹ who endeavored to determine exactly the quantity of the lochial discharge, and constructed the following table based on his observations, we have the:

<i>Lochies Sanguinolentes</i> ,	1st to 3d day	. . .	1,000	gramis.
“ <i>Séreuses</i> ,	4th “ 5th “	. . .	280	“
“ <i>Blanches</i> ,	6th “ 8th “	. . .	205	“

Total lochial flow on first 8 days . . . 1,485 grams.

A woman who nurses loses in all only . . . 1,085 “

One who does not nurse at all . . . 1,880 “

Burdach, in his Physiology, states that the lochial discharge lasts to the 3th or 5th day—less bloody, 8th to 10th day—serous, 10th to 30th day, when the woman nurses, and as long as 6 weeks when the woman does not nurse.

The earliest and only intimation we have that the sex of the child has an influence in determining the duration of the lochial discharge is in the book of Leviticus. The following is the Mosaic law concerning the purification of women:

“If a woman have conceived and borne a man child, then shall she be unclean seven days; . . . And she shall then continue in the blood of her purifying three and thirty days, . . . But if she bear a maid child, then shall she be unclean two weeks, as in her separation; and she shall continue in the blood of her purifying threescore and six days.”—Leviticus, chap. xii., verses 2, 4, 5.

The various commentators on the Pentateuch are not at all agreed upon the reason for this discrimination. Weemse ascribes it to the greater humidity of the female sex. Lange contents himself by referring to Hippocrates and Aristotle, and concludes “that this law has its foundation in the belief of antiquity that ‘the bloody and watery issue last longer after the birth of a female than of a male.’”

In this paper we have to deal with the physical and physio-

¹ Monatsschr. f. Geburtsh., vol. xix., p. 5.

logical reasons for this difference in the duration of the lochies according to the sex of the fetus.

In the first place, what evidence have we that the flow is longer after the birth of females than after the birth of males? And, in the second place—granted that it is longer—how do we explain why it should be? We have only the Scriptural assertion as an answer to the first, but, should we be able to explain why the flow should be longer with girls, we will have answered, in a measure, the first question.

Ten years since, I caused to be made, by a then resident physician of the Philadelphia Hospital, some observations on the duration of the lochial discharge in which the sexes of the children were kept separate. These observations were carefully made by a thoroughly reliable man, and the results recorded, but not published. When I inquired for them, they had been stored among some books and were inaccessible; so I was only able to get the general result, which confirmed the Scriptural teaching, viz., that the lochial discharge continued for a greater length of time after the birth of girls than after the birth of boys. It is greatly to be regretted that these tables are inaccessible; but I hope that some one else, who has the opportunity, will add to our knowledge of this subject, by making as many observations as possible, and publishing them in tabular form. It is evident that women in the same condition of life socially, and of the same temperament, should be compared. The following is a good form of table, the figures being imaginary:

PRIMIPARÆ WHO NURSE
GIRLS. BOYS.

CASES.	AGE.	TEMPERA- MENT.	SANGUINO- LENT DAYS	SEROUS DAYS	WHITE D'S.	TOTAL D'S LOCH. DIS.	CASES.	AGE.	TEMP ERA- MENT.	SANGUINO- LENT DAYS	SEROUS D'S	WHITE D'S.	TOTAL D'S LOCH. DIS.
1 21		Sanguine .	3	2	6	11	1 22		Sanguine...	3	2	2	7
1 23		Lymphatic	2	4	8	14	1 24		Lymphatic.	2	3	3	8
1 20		Nervous...	3	2	4	9	1 22		Nervous....	3	2	2	7
3	21.3	Average.				11.3	3	22.7	Average.				7.3

Another table for multiparæ who nurse.

Another table for primiparæ who do not nurse.

Another table for multiparæ who do not nurse.

There are three physical causes for suspecting that the flow is greater, or lasts longer, after the birth of females, viz., we have shown in this paper that the placenta is heavier in the case of a female fetus than with a male, and consequently larger, leaving a larger denuded or bleeding surface on the uterine cavity at the time of birth. Second—the process of formation and development of the female fetus from the time of quickening is more rapid, the time being shorter than with a male, leaving the mother in a more exhausted state from the effects of gestation. Third—a female gestation determines a greater, or does not disturb the natural humidity of the mother, whereas a male gestation probably determines in the mother a larger proportion of fibrin in the blood; in short, the blood is less aqueous than when a female is born.

From all of which we conclude that the lochial discharge continues for a greater length of time after the birth of females than after the birth of males.

15. Influence of the Sex of the Fetus on the Quantity, Quality, and Duration of the Lacteal Secretion.

In the fifth proposition of this paper, we discussed the influence of gestation on the composition or quality of the blood of pregnant women, as compared with the same women when not pregnant. It was there shown that pregnancy exercised a marked influence on the composition of the blood. "The density, both of the defibrinated blood and of the serum, is diminished, the water, the fibrin, and the phosphorized fat are increased, while the corpuscles and the albumen are diminished."

Andral and Gavarret found, on examining the blood of thirty-four pregnant women, that in the last months the fibrin increased to 4.3 above its physiological standard in the non-pregnant state. Having thus demonstrated the fact that pregnancy has the power of altering the proportion of the different elements entering into the composition of the blood, we are persuaded that this proportion differs more or less in each pregnancy, according to the age and temperament of the mother, and the sex, size, and vigor of the fetus.

We can understand, then, that the quantity, quality, and composition of the milk may be perceptibly influenced by the operation of one or more of these causes.

That there is an appreciable difference in the composition of the milk of women who bear boys, from those who bear girls, is quite possible, but whether the greater proportion of fluids entering into the composition of the fetal mass when a girl, than when a boy, causes the blood and milk of its (the girl's) own mother to become *more aqueous* or *less aqueous*, we are not prepared to decide, there being arguments in existence on both sides, as we shall see in the vulgar traditions of the women of Montpellier recorded by Joubert.¹ The two important questions upon which the decision of this point depends are: 1st, Does the excess in the proportion of fluids in the female fetus over that of the male diminish the proportion of fluids in the blood of its mother, or does it determine in the mother a condition of humidity corresponding to its own? 2d, Does the humidity of the mother correspond with that of the fetus when it is female, because both are of the same sex, and differ only when the fetus is male, or of a different sex?

We have no clue to the solution of these questions, except the fact ascertained by Martegoute, quoted in another place, that ewes that gave birth to female lambs were heavier at the time of conception, and lighter at the time of weaning, than those that bore males. If we take into consideration the fact that male lambs are heavier than females, this fact is increased in importance, indicating that it requires more nourishment after birth to produce a given weight of female mutton than even a *greater* weight of male mutton, corresponding exactly with what we have shown in this paper in proposition thirteen, on the placenta, wherein we have shown conclusively that it requires during intrauterine life a greater weight of placenta to nourish the female fetus than the male. We are taught that conditions tending to physical exhaustion are attended with what is vulgarly termed impoverishment of the blood, or the proportion of fluids is increased, or what is the same thing, the solids diminished. This condition of the blood and the attendant physical exhaustion may account for and support the com-

¹ Joubert: *La Première et Seconde Partie des Erreurs populaires Touchant la Médecine et le Régime de la Santé*. 8vo, Paris, 1587. 1st Edit., Bordeaux, 8vo, 1579. 2me Livre de la 1re partie des Erreurs populaires touchant la conception et la génération, pp. 59-246. Italian translation of this last part—Gioberti, *Errori popolari sulla concezione et generazione*, 4to, Fiorenza, 1592.

monly received opinion that women have a better color who bear boys. It seems then to be highly probable that the influence of the female fetus on the mother does not tend to greatly alter the composition of the blood, and that little, in the direction of greater humidity; while the male fetus probably determines in its mother a larger proportion of solids in the blood, and a corresponding difference in the milk, rendering the process of lactation less lengthly and less exhaustive.

Morier tells us that the Persians suckle male children two years and two months, and females two years complete.

Our women, says Joubert,¹ hold that the girls ought to nurse a shorter time than the boys, that eighteen months are enough for girls, while boys ought to nurse twenty-four. The reason which leads the women to say that the girls ought not to nurse so long as the boys is (according to my views) because they are more humid. He contends that this is false reasoning, as the girl ought really to nurse longer than the boy, to keep her humid, which is her nature, to prevent her from becoming dry, masculine, and prematurely old.

He further observes² that the women of Montpellier have the opinion handed down from one generation to another that the milk of a woman who has given birth to a girl is better for a boy, and vice versa. He contends that the milk of the woman who has borne a son is less hot than the milk of the woman who has borne a girl, and that the girl has need of a milk less warm (more aqueous). For a proof of this it is only necessary to observe the color and consistence of the milk which, according to our authors, are as follows: *Celuy d'une fille est roussatre, clair et ichoreux ou sereux, comme la virulance, excrement bilieux et chaud. D'un fils, le lait est plus blanc et epais, significant la chaleur y estre moindre de beaucoup, par ainsi le lait de celle qui a fait un fils, conviendra mieux à une fille, d'autant qu'il est moins chaud, et naturelle complexion de la fille requiert (pour y estre conservée, selon la condition de son sexe) semblable nourriture, et le fils sera mieux nourri du lait de celle qui a fait une fille, p. 222.*

Concerning the influence of the sex of the offspring on the

¹ *Erreurs Populaires*, pp. 241 et seq.

² *Ibid.*, p. 222-225.

mother during lactation, we have undoubted evidence in the practical experiments of Prof. Martegoute¹ who caused, at the end of each month, all the ewes of the flock of Blanc to be weighed individually, and thanks to these monthly weighings, various tables were constructed in which one saw the diminution or increase in weight of the different classes of sheep, according to age, sex, and the end one had in view to determine.

"Two of these tables were devoted to breeding ewes, one to those which produced and nourished males, and the other to those which produced and nourished females

"The comparison of these two tables furnished two remarkable facts:

"1st, The ewes that gave birth to females are, on an average, superior in weight at the time of conception to those that gave birth to males, and they lose sensibly more in weight than the latter during suckling.

"2d, The ewes that gave birth to males weigh less (at conception and during gestation) than those that bear females, and do not lose so much as the other class during suckling."

It is clear, then, from this practical test, that among sheep, the ewes that give birth to female lambs are heavier (fatter) at the time of conception, than those that bear males, and that at the time of weaning they have lost a larger proportion of their weight (which they had at the time of conception).

From all of which we are forced to conclude that gestation with and suckling of female offspring is physically a more exhaustive process on the mother than when the product is a male, corresponding with, and further confirming the fact already shown in the part of this paper on the placenta, that a greater weight of placenta is required to nourish the female fetus than the male.

16. *Influence of the Sex of the Fetus on Arresting the Growth, Development, and Nutrition of the Mother.*

THE function of reproduction, when active (that is, during gestation), is antagonistic to growth, development, and nutri-

¹ De la Production des Sexes chez le Mouton. Journal d'Agriculture Pratique, 8vo, Paris, 1858, p. 37 to 39.

tion, severally and combinedly. No one insists more strenuously upon the truth of this proposition than Herbert Spencer. He says: "It is a general physiological truth, that while the building-up of the individual is going on rapidly, the reproductive organs remain imperfectly developed and inactive; and that the commencement of reproduction at once indicates a declining rate of growth, and becomes a cause of arresting growth." Not only does reproduction (gestation) arrest growth and development during the *time of gestation and lactation*, but the arrest of development at the time of the first gestation precludes, in a great degree, if not absolutely, any further development subsequently.

Every one who has had any experience in the raising of cattle knows that the heifer that is permitted to breed in her second year, or before she is at least three years old, is "stunted," and retains more in size and appearance her condition as a calf. After her first gestation she neither develops nor grows. Females then should not be allowed to breed until they have reached maturity, or full development, not only for the sake of the quantity and quality of the product, but for the future welfare of the parent, and her subsequent progeny.

Women do not bear their heaviest children (among which there is a larger proportion of boys than at other periods) until they have reached maturity (ceased growing) and the menstrual function has been for a length of time well established, and the organs of reproduction have already borne fruit a few times. So great is this antagonism between reproduction and growth and development that women who menstruate early have heavier children in their first pregnancy than those who menstruate late, as may be seen from the following table of Wernich.

NO. OBS.	BOYS.	GIRLS.	MEAN
	GRAMS.	GRAMS.	BOTH SEXES.
642 1st born in general.....	3236	3117.70	3174.64.
69 1st born, mothers menstruated after nineteenth year.....	3166.84	3109.65	3138.24.
63 1st born, mothers menstruated before thirteenth year.....	3375.75	3193.29	3284.52.

From this table, it is clearly shown that boys suffer more than girls, in being the first born of mothers who have men-

struated late, there being a difference of 209 grams among the former class (boys) and only $83\frac{1}{2}$ among the latter class (girls). This fact is a further confirmation that very young women, and women who have menstruated late, have a larger proportion of girls among their first children; the production of boys being a more difficult rôle to them, the proportion increasing up to the twenty-sixth year of the mother, at which time she reaches her maximum of fecundity, according to Routh, and up to her twenty-ninth, according to Duncan. As a further explanation and proof of the greater exhaustion of the mother by a female gestation and lactation, we have elaborated from the records of the Philadelphia Hospital the following table based on 579 observations, in which the *length of body* (vertex to perineum) of the new-born child is compared with its entire length. We know of no statistics in which this point has been noted.

Table showing the numerical relation between the entire length and the length of body of the new-born child; also illustrating the fact of greater proportional length of body of female children over male, as first brought out by the author.

Average age of Mother.	Number of cases observed	Mother, single or married.	No. pregnancy.	Sex of Child.	Actual Length in Inches.		Proportion.	Weight.	
					Entire.	Body.		Lbs.	Oz.
21.92	168	S	1	F	18.95	12.43	100 : 65.59	6	13
20.90	153	S	1	M	19.42	12.59	100 : 64.83	7	7
					.47	.16	+.76		—10
22.88	48	M	1	F	18.56	12.27	100 : 66.11	6	7
23.35	54	M	1	M	19.15	12.50	100 : 65.27	6	14
					.59	.23	+.84		—7
26.26	51	S	2	F	19.30	12.54	100 : 65.07	7	9
23.70	17	S	2	M	19.60	12.66	100 : 64.59	7	12
					.30	.12	+.45		—3
26.06	44	M	2	F	19.26	12.66	100 : 65.79	7	7
23.38	44	M	2	M	19.66	12.95	100 : 65.87	7	12
	579				.40	.29	— .08		—5

There is probably an element of error in the above table, which, if eliminated, would still further increase the excess in the length of the female *trunk alone* over that of the male—I

refer to the probable greater length of head and neck (top of head to level of shoulders) in the male than in the female.

It would be more desirable to have the length of the trunk alone to compare with the entire length than the present method of taking the measurement from the crown of the head to the level of the perineum, and I would therefore suggest that an instrument be used adapted to taking this measure in obstetrical wards. A measure might be used, consisting of a Y-shaped rod, the forked end straddling the infant's neck, with projecting pieces at right angles touching the tops of the shoulders, and a sliding piece at the distal end, after the manner of a shoemaker's measure.

We read in our table that 168 unmarried woman of an average age of about twenty-one years in their first pregnancy gave birth to female children, in whom the entire length from vertex to sole of feet was to the length of their bodies (vertex to level of perineum) as 100 : 65.59 inches, whereas among the 153 male children born under similar circumstance, the proportion was as 100 to 64.83 only, and so on for each class, showing that in each instance *the female fetus has a longer trunk in proportion to its entire length (stature) than the male, consequently the vital organs presiding over digestion, assimilation, and nutrition have a relatively larger space allotted to them in the female than in the male.* The supply of vitality being greater, the demands of the system must be greater, increased, perhaps, by the greater demands of the reproductive system in woman. Life is longer, vitality is more tenacious among women than among men, and the same may be said of many of the lower animals.

Now we come to examine the relative influence of female fetuses as compared with males, in producing this arrest of growth, development, and nutrition of the mother. From an examination of the facts brought together in this paper, we are persuaded that the influence of the female fetus is greater than that of the male, and this opinion is based upon the following facts, viz.:

1. The probable greater and more active nutrition required by the female fetus during gestation and lactation.
2. The greater weight and surface of attachment of the placenta when a female.

3. The larger trunk of the female fetus, the vital organs consequently greater in total bulk. Greater number of females who die before labor begins. Twins of different sexes, the females sometimes sterile among cattle.

4. Longer duration of lochial discharge with females.

5. The experiments of Martegoute (see 15th proposition) showing that nursing female lambs caused a greater loss of weight than the nursing of males.

All these discriminations against the female indicate that gestations with and suckling this sex call for more nutrition from the mother than males do, and whichever requires most nutrition arrests most the growth and development of the mother. Hence, those women not yet fully mature have their development most interfered with or arrested by bearing first or more frequently girls than boys, and yet it is a well-ascertained fact that the more immature the woman is, the greater the probability of her bearing a girl, as we know the proportion of girls in such births is always larger than among women who are already the mothers of children, or have reached maturity. Why is it then that nature sets her hardest task first, and having set it, repeats this task sooner after the birth of a girl than after the birth of a boy, with the probability, however, that it will be an easier one, viz.: a boy?

We may attempt to answer this apparent anomaly by observing that the production of ova in such a vital or developmental condition as is best suited to produce males is a more difficult rôle on the part of the mother, than the production of eggs which will produce females when fecundated, as is attested by the fact that very young women, women who have menstruated late in life (in their first pregnancy), women subject to prevailing epidemics such as cholera, etc., women living in great ease and luxury in cities, all these have a larger proportion of female children than those who are older, who have menstruated early in life, or who live in a condition more allied to nature.

The only answer we can give to this question is, that changes must necessarily take place gradually, it would be impossible to have the female incapable of reproduction until the same fixed year in every instance. The fault is in making use of this function until the individual has reached maturity, at which

time nature provides that she should begin with males rather than females (that is, the proportion of males is largest at this time, hence the probability of having a male is greater than that of having a female).

The immature female is less able to produce eggs which will give males, the latter being the *higher rôle on the part of the female*. Male eggs, or eggs from which males are formed, have always been credited with being more highly developed than those from which females emerged, following the relative condition of the resultant product. Hence, the following couplet, adapted from one of the Latin poets :

In eating eggs, always choose the long,
Cock eggs are they, more nourishing and strong.

17. *The Influence of the Sex of the Child of a Preceding Pregnancy on Determining the Sex and Weight of the Child of the Next Succeeding Pregnancy.*

The following propositions have already been the subject of investigation by various authors, viz. :

1. Does the same proportion exist among the sexes in births of different pregnancies ? The answer has always been that : First (early) and later pregnancies furnish a larger proportion of girls than intermediate ones. Illegitimate births, among which a large proportion are first children, also furnish a larger proportion of girls than the proportion in the general total of legitimate births.

2. What influence does a child of one sex have on the weight of the next succeeding child when of a different sex, and when of the same sex ? This question has been answered by Wernich, from whose tables we have taken the trouble to elaborate others, in order to show the various effects of this influence.

It remains for us to show what influence the sex of the child of a preceding pregnancy has on the sex of the product of conception immediately following.

Table showing the influence of the sex of the child of a preceding pregnancy on the weight of the child of the pregnancy next succeeding, when a different sex and when of the same sex, arranged according to the number of the pregnancy. Elaborated from Pinard,¹ out of Wernich.²

Number of cases.	Variations of sex with mean weight (in grams).			Difference according to sex.
102.	1st a girl, 3073,	followed by a boy in 2d pregnancy,	3309.	+ 296 gm.
105.	1st a boy, 3326,	" " a girl in 2d "	3285.	- 41 "
133.	1st a boy, 3375,	" " a boy in 2d "	3406.	+ 31 "
80.	1st a girl, 3218,	" " a girl in 2d "	3268.	+ 45 "
73.	2d a girl, 3257,	followed by a boy in 3d pregnancy,	3382.	+ 125 gm.
87.	2d a boy, 3456,	" " a girl in 3d "	3359.	- 97 "
105.	2d a boy, 3406,	" " a boy in 3d "	3411.	+ 5 "
68.	2d a girl, 3292,	" " a girl in 3d "	3289.	- 3 "
37.	3d a girl, 3271,	followed by a boy in 4th p'gnancy,	3457.	+ 186 gm.
56.	3d a boy, 3335,	" " a girl in 4th "	3115.	- 220 "
40.	3d a boy, 3491,	" " a boy in 4th "	3475.	- 16 "
49.	3d a girl, 3289,	" " a girl in 4th "	3263.	- 26 "

Condensation of the above table, bringing the three classes (pregnancies) together :

1st, 2d, and 3d pregnancies; mean weight, grams.	2d, 3d, and 4th pregnancies; mean weight, grams.	Mean difference; grams.
In 210 cases, girl of 3,200, followed by a boy of 3,383.		Excess + 183.
" 248 " boy " 3,373, " " girl " 3,253.		Loss - 119.
" 278 " " " 3,424, " " boy " 3,430.		Excess + 6.
" 197 " girl " 3,266, " " girl " 3,272.		Excess + 6.

Average weight of :

Boys, 3,377 gms. where the *preced'g* & *succeed'g* child'n were of a *dif. sex*
 Girls, 3,327 " " " " " " " " " " " "

150 "
 Boys, 3,427 " " " " " " " " " of the same sex.
 Girls, 3,269 " " " " " " " " " "

158 "
 Average weight, all boys, both classes, 3,414 grams.
 " " " girls, " " " 3,246 "

168 "

From an examination of these tables, we discover the uniform rule, viz., a girl who precedes a boy is lighter in weight than a girl who precedes a girl—hence we deduce the following proposition :

¹ Art. Fetus. Dict. Encycloped. des Sci. Med., 1878, p. 486.

² Beiträge, 2; Geburtshülfe, I., 3-16, 1871.

The greater the weight of the girl, the greater the probability of her being followed in the next succeeding pregnancy by a child of the same sex, and *vice versa*, as may be seen by an examination of the following table:

							Mean of girls.
102	girls in a 1st pregn'y who preceded a boy weighed	3,073	gms.				
80	" " 1st " " " a girl	3,218	"				
							+ 145 "
73	" " 2d " " " a boy	3,257	"				
68	" " 2d " " " a girl	3,292	"				
							+ 35 "
37	" " 3d " " " a boy	3,271	"				
49	" " 3d " " " a girl	3,289	"				
							+ 18 "

Making a total for all pregnancies of:

210	gl's in 1st, 2d, & 3d pr. who preceded a b'y weigh'd	3,200	gms.
197	" " " " " " " " " a girl	3,266	"
		+ 66	"

Hence, girls who precede boys weigh a mean of 66 grams less than girls who precede girls, and from the following we learn that boys who precede boys weigh on an average 52 grams less than boys who precede girls:

248	b'ys in 1st, 2d, & 3d pr. who preceded a g'l weigh'd	3,372	gms.
278	" " " " " " " " " a b'y	3,424	"
<hr/>			
	Mean of boys, + 52	"	
210	" " " " " " " " " followed a g'l weigh'd	3,383	"
278	" " " " " " " " " a b'y	3,430	"
<hr/>			
	+ 47	"	
248	gl's " " " " " " " " " a b'y	3,253	"
197	" " " " " " " " " a g'l	3,272	"
<hr/>			
	+ 19	"	

Hence:—

A boy who *follows* a girl weighs 47 grams less than

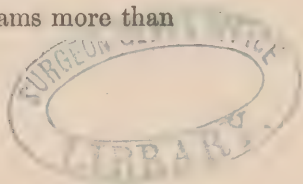
A boy who *follows* a boy.

A girl who *follows* a boy weighs 19 grams less than

A girl who *follows* a girl.

A boy who *follows* a boy weighs 158 grams more than

A girl who *follows* a girl.



- A boy who *precedes* a girl weighs 52 grams less than
 A boy who *precedes* a boy.
 A girl who *precedes* a boy weighs 66 grams less than
 A girl who *precedes* a girl.
 A girl who *precedes* a girl weighs 158 grams less than
 A boy who *precedes* a boy.

Table showing the order by sex of the births most favorable to the weight of the fetus.

Grams.			Grams.		
3,430.	Boy	follows a boy.	3,424.	Boy	<i>precedes</i> a boy.
3,383.	"	" a girl.	3,372.	"	" a girl.
3,272.	Girl	" a "	3,266.	Girl	" a "
3,253.	"	" a boy.	3,200.	"	" a boy.

The weight of the fetus depends to some extent on the length of the intergestation period which has immediately preceded it, as we have shown that boys who follow boys are heaviest, and are conceived a greater length of time after the previous birth than any other combination between the sexes, thus verifying the dictum of Wernich, who declares that increase of interval between births acts more beneficially than diminution.

18. *Influence of Sex of Fetus on the Length of the Intergestation Period.*

It is a well-known fact that the period between the birth of successive children in women who are not relatively sterile, is on an average eighteen months among the middle classes generally, and twenty-odd months among the upper classes, particularly when living in cities. The number of the pregnancy, especially after the seventh, seems to have a perceptible influence in shortening the period in each successive birth, until it has dropped from twenty-one months in the seventh to fifteen months in the eighteenth, as may be seen from an examination of the following table, by Ansell, based on 25,000 observations.¹

¹ Duncan: Sterility in Woman; London Lancet, Feb. 24th *et seq.*, 1883.

Table showing the Mean Time after Marriage of successive Births, and the average interval between them.

ORDER OF BIRTH	MEAN TIME OF BIRTH AFTER MARRIAGE.	AVERAGE INTERVAL BET. SUCES. BIRTHS.	ORDER OF BIRTH	MEAN TIME OF BIRTH AFTER MARRIAGE.	AVERAGE INTERVAL BET. SUCES. BIRTHS.
1st Child	1.32 years.	—	10th Child	16.33 years.	20.0 months.
2d "	3.02 "	18.0 months.	11th "	17.65 "	19.0 "
3d "	4.83 "	19.0 "	12th "	18.85 "	19.0 "
4th "	6.69 "	20.0 "	13th "	19.87 "	18.0 "
5th "	8.53 "	20.0 "	14th "	20.71 "	18.0 "
6th "	10.28 "	20.0 "	15th "	21.41 "	17.0 "
7th "	11.92 "	21.0 "	16th "	22.01 "	16.5 "
8th "	13.47 "	20.0 "	17th "	22.54 "	16.0 "
9th "	14.93 "	20.0 "	18th "	23.02 "	15.0 "

In another table, based on 6,035 observations corrected for still-births and twins, Ansell has shown that the mean interval between marriage and the birth of the first child is nearly sixteen months; 3,159 women having borne their first child before the first year of married life had elapsed, and nearly seven-eighths of the whole number (6,035) before the expiration of the second year.

Having now determined the mean time between the birth of children of different pregnancies, *without regard to sex*, it remains for us to show *the influence of the sex of the preceding fetus on the length of the intergestation period; that is, from a birth to the next succeeding conception.* We have just shown that the sex of a preceding fetus has a perceptible influence in determining the sex and weight of the fetus next succeeding it, and now we shall show that the length of the intergestation period is influenced by the sex of the fetus at each end of this period.

We have not been able to discover the expression of any opinion on this point to guide us in our researches, and have consequently been obliged to rely upon such data as were afforded by genealogical tables. In genealogies it is usual to give the date of the marriage and the date of birth, and name of each child born, and from these facts we have elaborated a table in which are clearly shown the points we wish to elucidate. Such families were selected as offered a fair proportion of the two sexes, and any period of three years or more between the births of two children was thrown out as showing a certain amount of relative sterility, or indicating a disturbing influ-

ence, such as disease, temporary suspension of intercourse, etc., etc.

The questions to be solved, then, are as follows:

1. What is the mean time between marriage and the birth of a boy?
2. What is the mean time between marriage and the birth of a girl?
3. What is the mean time between births when a boy follows a girl?
4. What is the mean time between births when a girl follows a boy?
5. What is the mean time between births when a boy follows a boy?
6. What is the mean time between births when a girl follows a girl?

(Pregnancies of the same number only to be compared.)

Plan for a Table showing the Mean Time between Births, also the Mean Time between a Birth and the next succeeding Conception, according to the Sex of the preceding and succeeding Fetus, and the Number of the Pregnancy.

ORDER OF SEXUAL DIFFERENTIATION.	FROM BIRTH OF GIRL TO BIRTH OF BOY		FROM BIRTH OF GIRL TO BIRTH OF GIRL		FROM BIRTH OF BOY TO BIRTH OF GIRL		FROM BIRTH OF BOY TO BIRTH OF BOY	
	M'ths.	Days.	M'ths.	Days.	M'ths.	Days.	M'ths.	Days.
Order & No. Preg.								
From 1st to 2d b'th								
“ 2d to 3d “								
“ 3d to 4th “								
“ 4th to 5th “								
“ 5th to 6th “								
Continuing in the same manner to, say the 20th Preg.								
Total all Pregnan.	22	20	23	19	25	03	38	26
Mean <i>intergesta-</i> <i>tion</i> period [Found by subtrac- ting period of ges- tation. ¹]	13	20	14	19	16	03	19	26
Total No. Observa- tions each category	15		17		19		18	
69 Observations.								

¹ A week less should be subtracted from gestations with girls than for boys.

Mean time from *marriage* to birth of *first child* (within 3 years) when a *girl*, — mos. — days.

Mean time from *marriage* to birth of *first child* (within 3 years) when a *boy*, — mos. — days.

I regret very much that I have not had the time nor the patience to collect and tabulate the intergestation period in a larger number of instances, involving as it does much tedious calculation, but the few observations I have tabulated in the following table, encourages me to believe that, as I predicted, the sex of the fetus has a very decided influence in determining the length of the intergestation period.

By subtracting nine months from the interval between births we get the

Mean Time between Birth and the following Conception, which we found to be as follows:

	NO. OBS.	BIRTH OF GIRL TO CON- CEP. OF BOY.	BIRTH OF GIRL TO CON- CEP. OF GIRL	BIRTH OF BOY TO CON- CEP. OF GIRL	BIRTH OF BOY TO CON- CEP. OF BOY.
British Peer- age. }	27	7 mo. 23 d. 233 d.	5 mo. 23 d. 173 d.	10 mo. 27 d. 327 d.	14 mo. 23 d. 443 d.
Hyde Gene- alogy. }	69	13 mo. 20 d. 410 d.	14 mo. 19 d. 439 d.	16 mo. 3 d. 483 d.	19 mo. 26 d. 596 d.

On examination of the above table, we discover that a woman conceives after the birth of a girl in 6 months 23 days to 14 months 4 days, according to the sex of this conception, and in 12 months 25 days to 17 months after the birth of a boy.

This difference in the length of the intergestation period is further corroborated by an examination of Ansell's table just cited, where the longest intergestation period is shown to be between the birth of the sixth and conception of the seventh child, or 21 — 9 12 months, showing a gradual increase from marriage to this period, and a gradual decline after it. Now it is known that, in general, women who marry at the usual age of eighteen to twenty-five, and live in wedlock until the climacteric, have a larger proportion of girls among the early and later children than among those born in the middle of the child-bearing period, thus confirming the results of our tables, though we have dealt with such a small number of cases.

Hence we conclude that women generally who conceive within two years after marriage, of a girl in their first preg-

nancy, will have a greater number of children and at shorter intervals, among which there will be a larger proportion of girls, than the woman who conceives under similar circumstances of a boy.

The sex, then, of the first child, is an index of the sex of the majority of the children the woman will bear, as well as an indication of her prospective fecundity, and comparative length of the intergestation period.

The woman who bears boys exclusively will have fewer children, and longer intergestation periods than the woman who has children of both sexes, or girls only.

Mr. Robertson,¹ in "An Attempt to Demonstrate the Law which Regulates the Intervals of Conception in the Human Female," says that the she-ass goes ten months and receives the male the seventh day after delivery, and the mare goes eleven months, and receives the stallion on the ninth day after delivery. In the cow, gestation lasts nine months, and she conceives three months after calving. The sheep and goat go five months, conceiving seven months after delivery—while the human female goes nine months and conceives nine months after delivery, and nurses a year to fifteen months.

Among the lower animals that depend upon grazing, when in a wild state, there is a tendency to bring forth the young in the spring when nourishment is more plentiful. The longer the period of gestation, the shorter the interval between birth and the following conception. The mare goes eleven months and must conceive within the month following, or she would bring forth later and later each successive year.

Among savage and barbarous peoples, it is not unusual to suckle children from three to five years, or even indeed until the mother becomes pregnant again; and, in some cases, going so far as to have the infants of two pregnancies at the breast at once.

Mr. Robertson, believing that suckling had some influence on the length of the intergestation period, questioned one hundred and sixty women, of an average age of thirty and one-half years, having given birth to six hundred and eighty-six children, or four and one-half each, five hundred and twelve of whom lived to be weaned, or three and one-half for each. Average

¹ Edinburgh Med. Jour., 1832, pp. 1-11.

age at weaning was fifteen and one-half months. Of these women, eighty-one became pregnant once or oftener during lactation, and seventy-nine had never conceived during lactation. Of the eighty-one who became pregnant during lactation, twenty-seven, who had produced one hundred and one children, had conceived on thirty-eight times during lactation. That forty-two who had always conceived during lactation, did not, on an average, conceive until they had suckled nineteen and one-third months nearly; and that twenty-two, the remainder of the eighty one, had been in the habit of conceiving during lactation, and soon after parturition. The average age for weaning was different in the two classes of women—in those who had not conceived during suckling, and those who had conceived once or oftener during suckling. For the seventy-nine women composing the former class, it was fourteen and one-fourth months; and for the eighty-one women of the latter class, it was fifteen and two-thirds months.

“The *first* corollary,” says Robertson, “which I would draw from the foregoing fact is, that in seven out of eight women who suckle for as long a period as the working classes in this country (Scotland) are in the habit of doing, there will *elapse an interval of fifteen months* from parturition to the commencement of the subsequent pregnancy.

“*Second*, That, in a majority of cases, when suckling is prolonged to even nineteen or twenty months, pregnancy does not take place until after weaning.

“*Third*, That lactation has an influence on the generative function; that, up to a late period in suckling, probably in this country about fifteen months, conception does not, in general, occur; and that hence we are warranted in regarding the secretion of milk as the *cause* which regulates the periods of conception in mankind, as instinct operates to the same end in graminivorous quadrupeds, and probably in all other animals.”

The tables to be found under Proposition 18, though founded on too few observations to be infallible, are yet interesting as showing that, among the peeresses of England, the intervals between birth and the next succeeding conception, though they have fewer children, was six months, or nearly one-third shorter among the mothers of New England—a difference which we are inclined to ascribe to the probable fact

that a much larger proportion of New England mothers suckle their children (at least at the time of the births from which these tables were made, viz., one hundred years ago). As we know that peeresses have fewer children, and from the above, as it appears, at shorter intervals, we are forced to conclude that among them the entire child-bearing period must be much shorter than among the women of New England, one hundred years ago.

In conclusion, the following questions present themselves, viz.:

Does suckling a female exhaust the mother more than suckling a male?

If so, what effect has this greater exhaustion in accelerating or retarding the next succeeding conception, that is, lengthening or shortening the intergestation period?

In answer to the first, we have only to repeat Prof. Martegoute's conclusion from his experiments with sheep, in which he found that female lambs exhausted the mother more than the suckling of males. Notwithstanding this greater exhaustion from suckling females, from our tables we learn that a woman conceives from three to six months sooner after the birth of a girl than after the birth of a boy, from which we must conclude that this exhaustion, or rather the causes which bring it about, determine in the woman a genetic tendency which may be defined to be a disposition to reproduction rather than to nourishment. This corresponds with what writers on population tell us, viz., that years of famine (necessarily attended by a certain amount of physical exhaustion from lack of food) are followed by increase in births and in the proportion of male children, thus confirming the law that reproduction and growth are antagonistic.

19. *Influence of the Sex of the Fetus on the Mind of the Mother.*

Thus far, we have omitted to discuss the influence of gestation and lactation on the mind of the child-bearing woman. Puerperal mania seldom appears, if indeed at all, before labor sets in. And from Esquirol we learn that out of every twelve women who are insane, one owes the origin of her malady to child-bearing. Of those women who have puerperal mania, two-

fifths were attacked within the first fifteen days after labor ; one fifth from the fifteenth day to the end of the second month ; another one-fifth after the third month ; and the last one-fifth immediately after weaning. It remains for us to inquire what influence nursing has on producing or aggravating this malady, and finally, whether those women who have given birth to and nurse girls are not more frequently attacked by this form of insanity than those who bear and nurse boys, as the testimony of the facts brought forward in this paper would seem to indicate, particularly if there be, as we believe, a traceable relationship between this malady and the nervous and physical exhaustion of the mother.

20. *Influence of Co-Twins of Different Sexes on the Mother and on Each Other.*

That the opinion that one of a pair of twins is sterile is not a modern discovery may be gathered from the following, out of Joubert:¹ S'il est vray que de gemeaux l'un est inepte à engendrer ; et semblablement des gemelles, l'une est inepte à concevoir : et si les gemeaux ne peuvent faire d'autres.

Free-martin is a name given to a female calf born co-twin with a male, and almost always sterile from this fact, while the male co-twin is able to engender.

This fact seems to indicate that where a male and a female fetus are exposed to exactly the same conditions during gestation, it is the female which fails to come to perfection, possibly from lack of nourishment, or some influence of the male co-twin on the mother, reacting on the female. There may be a developmental prepotency on the part of the male twin.

I know of no statistics in which the relative mortality before birth of co-twins is mentioned, but we have shown in this paper that the number of females (in single births) who die during gestation (before labor) exceeds the number of males, and we believe that this excess is still greater in twin births of females than with males. The greater exuberance of vitality of ovum destined to produce a female is further shown in the fact that double monsters are four times as frequently females as male. Twins, of whatever combination of sexes, suffer from this fact alone, it being impossible to produce two crea-

¹ Erreurs populaires, etc. 8vo. Paris, 1586. 2d pte., p. 141.

tures as perfect and vigorous as if only one had been born. This view is strengthened by the observations of Arthur Mitchell,¹ who "shows that twins are peculiarly liable to be imbeciles or idiots." The conclusions of Mitchell's paper are so pertinent to the present subject that I quote them here at length. 1. "Among the imbeciles and idiots a much larger proportion is usually found to be twin-born than among the general community. 2. Among the relatives of imbeciles and idiots twinning is also found to be very frequent. 3. In families, when twinning is frequent, bodily deformities (of defect and of excess) likewise occur with frequency. 4. The whole history of twin births is exceptional, indicates imperfect development and feeble organization in the product, and leads us to regard twinning in the human species as a departure from the physiological rule, and therefore injurious to all concerned. 5. When we pass from twins to triplets and quadruplets, everything we know regarding these latter gives support to the general conclusions in question."²

In conclusion, I cannot too strongly urge the importance in all statistical tables of separating the sexes, and in individual cases to state the sex of the child. In all statistical work, separate tables should be made for each sex, so that inquirers of all classes may be able to make a selection of such facts as they may need to illustrate any subject from the point of view from which they may wish to regard it. In all physiological inquiries, the results should be tabulated by sexes. In cases of placenta previa, extrauterine gestation, and *phlegmasia alba dolens*, the sex of the child is seldom stated in the reports of cases. Dr. Parry was only able to find the sex stated in eighty cases of extrauterine gestation, and I have only been able to discover the same number of cases of placenta previa wherein the sex was stated.

There is an interesting field of investigation open in the study of the *placenta*, regarding its *site*, *weight*, and *shape*, by sex of fetus. Who will prove what we conjecture, viz., that the placenta of the female fetus has a larger surface of attachment to the womb than that of the male?

¹ Medical Times and Gazette, November 15th, 1862.

² Duncan: London Lancet, March 24th, 1883, p. 492.

ERRATA.

Page 5, 12th line, read "on determining."

" 10, 11th line, read "and the testicle spermatozoids," instead of "or spermatozoids."

" 11, 23d line, read "is strengthened" instead of "is not strengthened."

" 67, next to last line, read "than among."

